File Location Change



Mission Boulevard (Route 262) Express Lane Project Feasibility Study

Fremont, California



prepared for the

ALAMEDA COUNTY CONGESTION MANAGEMENT AGENCY



prepared by

Rajappan & Meyer Consulting Engineers, Inc. and TJKM Transportation Consultants

March 1998



March 16, 1998

Ms. Jean Hart Deputy Director Alameda County Congestion Management Agency 1333 Broadway Suite 220 Oakland, CA 94612

RE: Final Draft

Mission Boulevard (Route 262) Express Lanes Feasibility Study

Dear Jean:

I am pleased to submit our final Mission Boulevard Express Lanes Feasibility Study.

We have determined in this feasibility study that implementation of elevated express lanes on Mission Boulevard (Route 262) from the UPRR overhead to I-680 in either both directions, or in one direction (westbound), is indeed feasible and beneficial from a traffic operation standpoint. Implementation of two-direction elevated lanes would cost approximately \$74 million. Implementation of westbound-only only elevated express lanes would cost the least, at approximately \$ 47 million. Construction of either two-direction or one-direction elevated facilities would require approximately the same amount of right of way.

Further engineering studies are required to develop the design, provided additional coordination with the ongoing Route 262/I-880 Interchange Reconstruction Project, and to answer a number of technical and environmental questions.

It has been a pleasure conducting this study for the CMA.

Sincerely,

RAJAPPAN & MEYER CONSULTING ENGINEERS, INC.

Keith G. Meyer, P.E.

Vice President

TABLE OF CONTENTS

SECTION NUMBER	<u>Description</u>	PAGE
1.	INTRODUCTION	1
2.	PROJECT DESCRIPTION	1
3.	PROJECT OBJECTIVES	2
4.	ALTERNATIVES Through-Traffic Express Lanes I-680 End Treatment West End Treatment	3 3 4 5
5.	TRAFFIC FORECASTS AND OPERATIONS Traffic Forecasts Traffic Operations	5 5 6
6.	RIGHT OF WAY IMPACTS Alternative 1 Alternative 2	8 8 9
7	COST ESTIMATES	9
8.	POSSIBLE REVERSIBLE FACILITY	9
9.	POSSIBLE HOV FACILITY	10
10.	IMPLEMENTATION ISSUES I-680/Mission Boulevard Interchange Visual Impact Seismic Design Noise Impacts Local Community Acceptance Coordination with I-880/Route 262 Reconstruction	10 10 10 11 11 11
	Regional Benefit	
11,	IMPLEMENTATION Implementation Schedule Next Steps	11 11 11
12.	CONCLUSIONS	12

LIST OF FIGURES

FIGURE NUMBER	DESCRIPTION	PAGE
1.,	Project Location	1
2.	Two Way Express Lane Cross Sections	3
3.	WB Express Lane Cross Sections	4

LIST OF TABLES

TABLE NUMBER	<u>DESCRIPTION</u>	PAGE
1.	Traffic Forecasts – Mission Blvd/Warm Springs	6
2.	Traffic Forecasts - Mission Blvd/Mohave Drive	6
3.	Level of Service Descriptions	7
4.	Level of Service Comparisons - Alternative 1	7
5.	Level of Service Comparisons – Alternative 2	8

LIST OF APPENDICES

APPENDIX NUMBER	DESCRIPTION
A.	Alternative 1 Layout and Profiles
В.	Alternative 2 Layout and Profiles
C.	I-880/Route 262 Interchange Concept
D.	Traffic Forecasts and Operations Analysis
E.	Cost Estimate Details

ACKNOWLEDGMENTS

Funding for this study was provided by the City of Milpitas.

Technical Study Team Members included:

Rajappan & Meyer Consulting Engineers, Inc. Keith Meyer – Study Manager

Daniel Ho — Design Engineer

TJKM Transportation Consultants Christopher Kinzel

City of Fremont Allen Shelley

City of Milpitas David M. McNeely

Joe Oliva

Santa Clara County Valley Transportation Agency Mike Evenhoe

Carolyn Gonot

Alameda County Transportation Authority Christine Monsen

Caltrans District 4 Dianne Steinhauser

Pat Pang

Emily Landin-Lowe

Parsons Brinckerhoff Quade & Douglas Gene McCarthy

APEX Consultants Eileen Goodwin

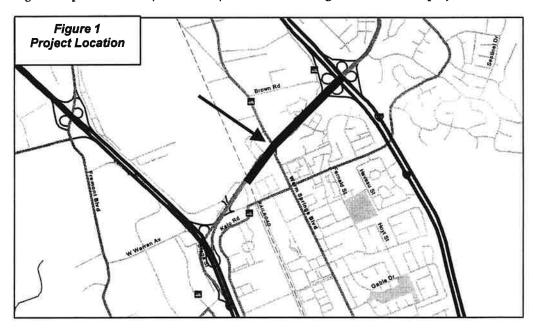
1. INTRODUCTION

This study has been prepared to determine the feasibility of a short range, cost-effective solution to improving traffic congestion along Route 262 (Mission Boulevard) in the City of Fremont. The project has been undertaken by Rajappan & Meyer Consulting Engineers, Inc., under contract to TJKM Transportation Consultants and the Alameda County Congestion Management Agency. Funding for this study has been provided by the City of Milpitas. Coordination has been provided with Caltrans District 4, the City of Fremont, the Alameda County Transportation Authority, the City of Milpitas and the Santa Clara Valley Transportation Authority Congestion Management Program. This final report reflects comments received by the City of Fremont, the City of Milpitas and the Alameda County Congestion Management Agency.

2. PROJECT DESCRIPTION

The proposed project would provide for a near-term (5-10 year) improvement to Mission Boulevard (Route 262) between the UPRR overcrossing and I-680 in the City of Fremont. Long range planning studies conducted by Caltrans in the early 1990's on a cross-connector between I-680 and I-880 identified potential corridor freeway improvements costing over \$500 million. The cross-connector project to date has focused on a freeway facility for the connection between I-680 and I-880, with attendant improvements to each connecting freeway.

The objective of this express lane study is to identify a less costly project that would improve peak period levels of service along Mission Boulevard through construction of a grade-separated facility for freeway-bound traffic. Figure 1 shows the project location:



Two alternatives have been considered in this feasibility study:

<u>Alternative 1</u>, would provide a two-way elevated facility with two through-lanes in each direction above Mission Boulevard.

<u>Alternative 2</u>, would provide a one-way westbound facility with two through lanes above Mission Boulevard. Eastbound Mission Boulevard would be widened to 4 through lanes at the surface level.

The focus of this improvement project is along Route 262, Mission Boulevard. No alternative routes (i.e., Route 237 or Montague Expressway) were explored in this study.

Also, no improvements at the I-680/Mission Boulevard Interchange are proposed in this study, although modification of the interchange would likely be required to gain the most efficiency for the Mission Boulevard Express Lanes. Improvements at this interchange are recommended to be explored in the next phase of work.

3. PROJECT OBJECTIVES

The purpose of the project is to provide near term relief to very congested peak period traffic conditions along Mission Boulevard. It is not necessarily intended to be the long-term solution to the cross-connection between the I-680 and I-880 corridors, since that project has been estimated to cost in excess of \$500 million. The objectives of the near-term project include:

- 1. To provide an affordable solution within the funding resources of the region.
- 2. To relieve existing congestion at signalized intersections along Mission Boulevard.
- 3. To provide "express-lanes" for through traffic between I-680 and I-880.
- 4. To accommodate at least Year 2010 forecasted traffic for both Mission Boulevard intersections and through traffic on the express lanes.
- 5. To minimize right-of-way acquisition.
- 6. To coordinate with concept designs underway at the I-880/Mission Boulevard Interchange by the Alameda County Transportation Authority and Caltrans.
- 7. To provide a design solution acceptable to both Caltrans and the City of Fremont.

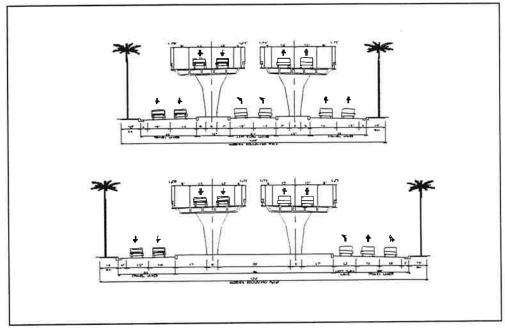
4. ALTERNATIVES

The project has several options for connection of each end and for movement of through traffic through the Mission Boulevard corridor. These are broken out into alternatives for through-traffic and treatments at each end, one at I-680, and the other at the UPRR overcrossing.

Elevated Traffic Express Lanes. Two alternatives for separation of through traffic have been considered in this evaluation:

Alternative 1, would provide a four-lane travel-way (two lanes in each direction), elevated above Mission Boulevard. A layout and profile for this project are provided in Appendix A. Typical sections for this facility are shown in Figure 2.

Figure 2
Cross Section for Two-Way Elevated Express Lanes



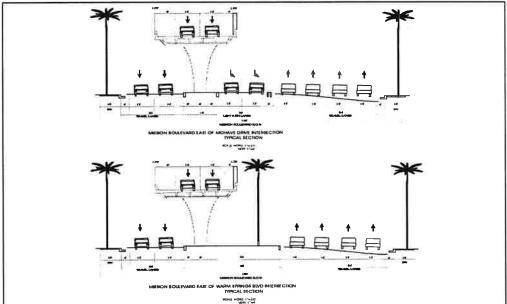
The elevated sections would meet design standards for typical direct connector ramps, with 4 ft. inside shoulders and 8 ft. outside shoulders. Several structural options were explored, including:

- Option 1 Elevated on retained earth (with retaining wall or MSE panel).
- Option 2 Elevated on structure with a continuous section for all lanes.
- Option 3 Elevated on structure with independent structures for EB and WB directions.

The recommended section is Option 3, for several reasons. First, independent structures can be built separately (the westbound direction could be built first to solve the worst traffic problem). Second, independent structures would provide better appearance and allow light to penetrate between structures. Third, independent structures would provide easier construction staging due to less width. Option 1 is not recommended due to the bulky mass of retaining walls or MSE panel walls that would be viewed from the side. Option 2 is not recommended due to the large continuous structure, which would provide a bulky appearance and shadows.

Alternative 2, would provide a two-lane travel-way for westbound traffic only, elevated above Mission Boulevard and a four lane travel way for eastbound traffic at the surface level. A layout and profile for this project are provided in Appendix B. Typical sections for this facility are shown in Figure 3.

WB Elevated Express Lane Cross Sections



I-680 End Treatment. The east end of the project would require construction of partial direct ramps to and from Mission Boulevard east and the I-680 on and off ramps. Two options were explored:

- Option 1 Provide elevated ramps to and from right side of freeway ramps.
- Option 2 Provide elevated ramps to and from left side of freeway ramps.

In order to take advantage of favorable ramp grades, the express lane ramp from the SB I-680 off ramp is recommended to begin from the right side of the ramp, and stay elevated over traffic from WB Mission Boulevard. For traffic going to SB I-680, traffic from the EB Express Lanes is recommended to enter the ramp on the left side.

Figure 3

The four-quadrant full cloverleaf that exists at the I-680/Mission Boulevard Interchange is well-suited for the express lane concept, since no traffic signals exist within the interchange. Two concepts for terminating the express lanes on Mission Boulevard were explored, including:

Concept 1 - Begin/End ramps on inside of Mission Boulevard travel way.

Concept 1 - Begin/End ramps on outside of Mission Boulevard travel way.

Concept 1 would be the least expensive of the two ramp configurations, with traffic entering and exiting the express lanes from the inside (left) lanes of Mission Boulevard under I-680. Some problems may occur with weaving traffic between the loop ramps and the express lane ramps with this concept.

Concept 2 would partly mitigate this problem by placing the direct ramp connections to and from Mission Boulevard on the right side, thus minimizing weaving for the largest movements to and from the I-680 loops. This option would be more expensive.

West End Treatment. The connection with the Route 262 freeway section under the two UPRR tracks would be fairly straightforward, with express lane ramps ascending/descending at a 7% grade. Mission Boulevard access ramps would be single lane ramps. While the existing cross-section under the UPRR tracks would need to be widened, it is understood that this required widening would take place with the proposed I-880/Route 262 interchange reconstruction project.

The express lane project would connect directly with the proposed I-880/Mission Boulevard interchange reconstruction concept. This interchange reconstruction concept is shown in **Appendix C**. Further evaluation of the Kato Road ramp movements to and from Route 262 east area required, since the Kato Road ramps would not be able to access the express lanes.

An option of leaving the express lanes elevated over the UPRR tracks was explored, which would avoid the need to reconstruct the UPRR overcrossing. However, the profiles of the ramps are not favorable to connect with the future I-880/Route 262 interchange concept.

5. TRAFFIC FORECASTS AND OPERATIONS

Traffic Forecasts. Traffic forecasts were prepared by TJKM Transportation Consultants, based on the City of Fremont travel forecast model. Peak hour 2010 traffic volumes for the express lanes are forecasted to range from 2,250 vph to 2,500 vph, well within the capacity of the express lanes. Year 2010 traffic volumes traveling to and from Mission Boulevard are forecasted to range from 1,300 vph to 1,450 vph, well within a single lane ramp movement's capacity. Existing and Year 2010 intersection traffic forecasts are provided in Appendix D and summarized in Tables 1 and 2:

Table 1

Traffic Forecasts - Mission Blvd/Warm Springs

		Existing	Volumes		2010 Build	Year With Expre	
Move	ement	AM	PM	AM	PM	AM	PM
NB	Right	83	408	100	450	100	450
	Thru	317	802	400	600	400	600
	Left	504	334	500	400	500	400
SB	Right	439	197	450	300	450	300
	Thru	710	357	700	600	700	600
	Left	168	204	225	200	225	200
EB	Right	236	142	250	150	250	150
	Thru	785	1508	1225	2560	125	400
	Left	142	209	200	200	200	200
WB	Right	131	133	175	150	175	150
	Thru	2024	984	3000	1450	500	250
	Left	394	191	425	200	425	200

Source: TJKM Transportation Consultants, 1997

Table 2

Traffic Forecasts - Mission Blvd/Mohave Drive

Movement		Existing Volumes		Year 2010 No Build		Year With Expre	
		AM	PM	AM	PM	AM	PM
NB	Right	140	252	175	250	175	250
	Thru	56	95	75	100	75	100
	Left	176	112	250	150	250	150
SB	Right	66	23	125	200	125	200
	Thru	56	114	75	150	75	150
	Left	129	206	150	200	150	200
EB	Right	54	95	50	150	50	150
	Thru	1021	2152	1475	3100	375	850
	Left	20	20	25	50	25	50
WB	Right	59	32	50	50	50	50
	Thru	2322	1005	3225	1450	725	250
	Left	221	197	225	200	225	200

Source: TJKM Transportation Consultants, 1997

<u>Traffic Operations.</u> Operations evaluations were conducted at signalized intersections for both alternatives. Desirable level of service for this facility is LOS D in the AM and PM peak hours. Table 3 provides a description of levels of service.

Table 3
Level of Service Definitions

		DESCRIPTION	OF LEVEL O	F SERVICE CONDITIONS	
	1	SIGNALIZED INTERSECTIONS	UNSIGNAL	IZED INTERSECTIONS	ROADWAY SEGMENTS
OF	VERAGE STOPPED DELAY	DESCRIPTION	RESERVE CAPACITY	DESCRIPTION	DESCRIPTION
A	5 Seconds or less	Very low delay Most Vehicles arrive during Green phase and do not stop at all	Greater than 400 Vehicles per hour.	Little or no delay	Highest quality of service. Free-flow traffic conditions, Little or no restrictions on maneuverability or speed. No delay
В	Between 5 and 15 seconds	Low delay. More vehicles stop that for LOS A causing higher average delay	Between 300 and 399 vehicles per hour	Short traffic delays	Reasonably free-flowing conditions Low restrictions on maneuverability No delays
С	Between 15 and 25 seconds	Moderately delay. Some vehicles may wait for more that one signal cycle.	Between 200 and 299 vehicles per hour	Average traffic delays	Stable traffic flow, but less Freudian to select speed, change lanes, or pass. Minimal delay.
D	Between 25 and 40 seconds	Moderately high delay. Congestion becomes more noticeable. Many vehicles stop and many will wait through more that one cycle	Between 100 and 199 vehicles per hour	Long traffic delays	Borders on unstable flow. Freedom to maneuver is severely limited. Speeds tolerable but subject to sudden and considerable variation. Minimal delay
E	Between 40 and 60 seconds	High delay. Many more vehicles will wait through more than one signal cycle. Long queues on critical approaches.	Between 0 and 99 vehicles per hour	Very long traffic delays	At or near capacity, Unstable traffic flow with rapidly fluctuating speeds and flow rate, Low maneuverability and drive comfort. Significant delay.
F	Over 60 seconds	Very high delay. Demand exceeds capacity of intersection. Long queues form.	Less than 0 vehicles per hour	Failure-extreme congestion	Forced traffic flow. Speed and flow may drop to zero with high densities. Considerable delay.

For <u>Alternative 1</u>, with both directions of express traffic elevated above Mission Boulevard, local and express lane movements would operate at LOS D or better for 2010 traffic conditions.

The surface signalized intersections on Mission Boulevard would require two through lanes plus single or double left turn lanes for LOS D operation or better. Level of service comparisons with and without the elevated express lanes are shown in Table 4, as follows:

Table 4
V/C and Level of Service Comparisons – Alternative 1 – EB and WB Elevated Lanes

Intersection	Existing		No E	r 2010 xpress nes *	Year 2 With Ex Lan	press
	AM	PM	AM	PM	AM	PM
Mission Blvd./Warm Springs	0.86	0.78	1.06	1.00	0.77	0.71
	D	C	F	E	C	C
Mission Blvd/Mohave Drive	.077	0.98	0.95	0.98	0.64	0.90
	C	E	E	E	B	D

^{*} Assumes implementation of the 3rd EB lane STIP project currently planned by the City of Fremont. Source: TJKM Transportation Consultants, 1997

The express lanes would operate at LOS C for both 2010 AM and PM conditions. The traffic operations analysis sheets from TJKM are also provided in **Appendix C** to this report.

For <u>Alternative 2</u>, with only the westbound direction elevated above Mission Boulevard, eastbound traffic would operate on four surface through-lanes, plus double left turn lanes. The dual-lane elevated express lanes would again operate at LOS C for both 2010 AM and PM conditions.

The surface signalized intersections on Mission Boulevard would require two westbound through lanes, four eastbound through lanes, plus single or double left turn lanes for LOS D operation or better. Level of service comparisons with and without the elevated express lanes are shown in **Table 5**, as follows:

Table 5
V/C and Level of Service Comparisons – Alternative 2 – WB Elevated Lane Only

Intersection	Existing		No E	r 2010 xpress nes *	Year 2 With WB I Land	Express
	AM	PM	AM	PM	AM	PM
Mission Blvd./Warm Springs	0.86	0.78	1.06	1.00	0.86	0.87
	D	C	F	E	D	D
Mission Blvd/Mohave Drive	.077	0.98	0.95	0.98	0.77	0.84
	C	E	E	E	C	D

* Assumes addition of 4th EB lane

Source: TJKM Transportation Consultants, 1997

The traffic operations evaluations show that a combination of elevated in the westbound direction and four lanes in the eastbound direction would operate nearly as well as the two-direction elevated facility.

6. RIGHT OF WAY IMPACTS

Right of way impacts for each alternative are relatively minimal, with the one-direction express lanes requiring the least right of way.

Alternative 1. Due the overlapping nature of the cross section, with the express lanes cantilevered over one lane of Mission Boulevard, the construction of the express lanes would require minimal right of way impact for a facility of this type. The major impact would be on the south side of Mission Boulevard from Mohave to I-680 and on the north side of Mission Boulevard between Mohave to I-680, where two strips of commercial property would be required. The total right of way take for the proposed project would be approximately 54,000 square feet. No building relocations would be required. Utility relocations are expected to include PG&E facilities.

Alternative 2. Due the reduction in land required at the east end of the project for this alternative (since braided ramps are not required), less right of way would be required than Alternative 1. Again, the major impact would be on the south side of Mission Boulevard from Mohave to I-680 and on the north side of Mission Boulevard between Mohave to I-680, where two strips of commercial property would be required. The total right of way take for Alternative 2 would be approximately 45,000 square feet. No building relocations would be required. Utility relocations are expected to include PG&E facilities.

7. COST ESTIMATES

Implementation costs for each alternative would include construction of roadway widening, construction of elevated roadway on structure, provisions for braided ramps to access the east and west ends of the expressway, right of way, and local street reconstruction. Significant savings would be achieved with Alternative 2, due to reduction of structure costs. The estimated costs in 1998 dollars, using the ACTA cost estimating guide, are provided in **Appendix E**, and include the following:

Activity	Alternative 1	Alternative 2
PSR	\$ 0.5 million	\$ 0.5 million
Environmental Document/P.E.	\$ 1.5 million	\$ 1.5 million
Engineering	\$ 6.4 million	\$ 3.7 million
Construction Management	\$ 6.4 million	\$ 3.7 million
Construction	\$ 50.7 million	\$ 32.1 million
Right of Way	\$ 1.6 million	\$ 1.0 million
Project Reserve	\$ 6.7 million	\$ 4.3 million
TOTAL	\$ 73.8 million	\$ 46.8 million

8. Possible Reversible Facility

Due to the high directionality of the 2010 traffic volumes (65/35 split AM, 70/30 split PM). the project appears to have potential as a reversible facility. The facility would operate in the westbound direction in the morning and in the eastbound direction in the afternoon. As with all reversible facilities, attention must be given to appropriate and safe ramp termini at each end of the project. Construction of a two-lane reversible facility in the median are estimated to cost in the range of \$60 million total, due to the addition of lane reversal facilities at either end. Reversible facilities may not be practical or possible to construct at the west end due to the undercrossing of the railroad. Further studies are recommended.

9. Possible HOV Facility

Preliminary HOV lane estimates by TJKM indicate that between 20 and 30 percent of all vehicles would carry two or more persons and utilize an HOV lane. Under these circumstances, between 500 and 750 high occupancy vehicles and 1,750 to 2,000 mixed flow vehicles would desire to operate on the expressway facility.

Given these estimates, it appears that use of the express lanes for HOV are not practical or beneficial, for the following reasons:

- The length of the connector is relatively short and the normal pay-off from HOV lanes probably wouldn't occur, even with future HOV lanes on both I-680 and I-880.
- It would be difficult to institute HOV lane transitions at either end of the project.
- The mixed flow volumes remaining would exceed the capacity of a single mixed flow lane, thus requiring three lanes in each direction.
- Current plans for the I-880/Route 262 Interchange Reconstruction Project do not include HOV lanes on Route 262.

10. IMPLEMENTATION ISSUES

A number of issues should be addressed in further traffic forecasting, engineering and environmental studies. These include:

Design Standards. A fundamental agreement must be reached with Caltrans that the express lanes are not a freeway facility, but are ramp I-680 ramp extensions. This design approach reduces the shoulder width to a point that the facility can mostly fit within the existing right of way. This concept is not unlike the northbound I-380 ramp connector from San Francisco International Airport. An advisory design exception would be required at the ramp entrance to southbound I-680, for less-than-standard merge taper (30:1).

<u>I-680/Mission Boulevard Interchange</u>. This interchange will be operating at capacity by the year 2010. Further demands would require reconstruction. Reconstruction of this interchange needs to be explored to provide a complete connection between I-680 and I-880.

<u>Visual Impact.</u> The construction of elevated express lanes would have significant impact to the viewshed along Mission Boulevard. The elevated concept would need to be fully explored with neighborhood and businesses during the environmental process.

Seismic Design. Mission Boulevard cuts across the Hayward Fault. As a result, the potential impact to an elevated structure would need to be developed in the next phase of design. Design elements would need to be established to ensure the structure would not fail during a major seismic event.

Noise Impacts. The express lanes would elevate primary traffic volumes to approximately 21 feet above the current grade of Mission Boulevard. Roadway noise may be increased to adjacent neighborhoods. Sound walls may be required along the structure to mitigate increased noise. Further visual impacts would occur due to sound-walls attached to the express lane structures. An allowance for sound walls have been included in the estimated costs for each alternative.

Local Community Acceptance. A public input program should be conducted in the next step of the project to determine the potential for public acceptance of the elevated structure and surface roadway improvements.

Coordination with I-880/Route 262 Reconstruction. Special coordination would be required with the final design configuration of the Route 262/I-880 Interchange Reconstruction Project, and specifically the Kato Road overcrossing and ramps to and from Route 262.

Regional Benefit. Prior studies have included Route 237 and Montague Expressway in Milpitas as alternative routes for the cross-connector project. The primary reason is that it is believed that traffic between I-680 and I-880 has significant origins and destinations in Santa Clara County, although the mix of traffic using Mission Boulevard is not certain. Origin-destination information would need to be verified to confirm the need and benefit, as well as to refine the traffic forecasts for design of the project.

11. IMPLEMENTATION

Implementation Schedule. Due to the unfunded nature of this project, the timeline for implementation is not possible to predict. If funds were made available, the implementation time frame could be much shorter than previous cross connector concepts. Given the focus of improvement on Mission Boulevard (instead of regionally), a reasonable, but aggressive, time frame for implementation of either Alternative 1 or Alternative 2 would be as follows:

1 year
2 year
1 year
1 year
2 years
7 years

Next Steps. Since this project is on State Route 262, Caltrans would be the owner operator of the facility. This dictates that Caltrans' Project Development Procedures be followed to develop, design and environmentally clear the project. A Caltrans "Project Study Report" needs to be prepared as the next step, which would build on the efforts of this study and provide additional information on design, design exceptions, traffic operations, environmental impacts, right of way, hazardous materials, and structural elements.

The PSR could be prepared either by Caltrans or a consultant to a local agency. The determination of who leads the next step needs to be established and priorities set to conduct this work.

In addition, it is likely that a Federal "Major Investment Study" (MIS) would need to be conducted to determine the suitability of the project relative to other corridors and modes. This effort could be conducted concurrently with the PSR effort.

12. CONCLUSIONS

It is determined in this feasibility study that implementation of elevated express lanes on Mission Boulevard (Route 262) from the UPRR overhead to I-680 in either both directions, or in one direction (westbound) are indeed feasible and beneficial from a traffic operation standpoint. Provision of WB only express lanes would cost the least, at approximately \$ 47 million. Construction of either two-way or one-way elevated facilities would require approximately the same amount of right of way.

Further engineering studies are required to develop the design, provided additional coordination with the ongoing Route 626/I-880 Interchange Reconstruction Project, and to answer a number of technical and environmental questions.

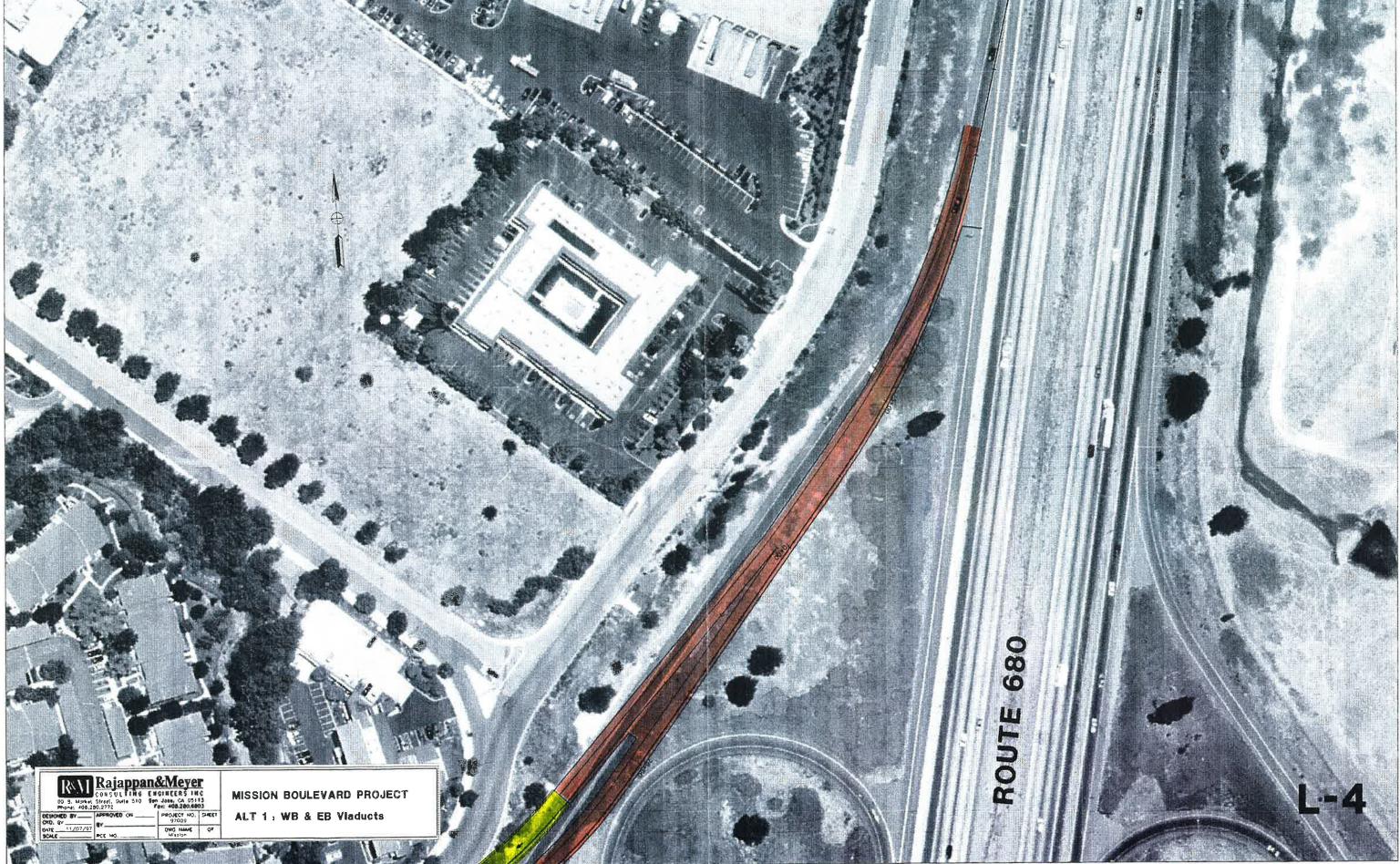
Appendix A Dual Expressway Concept

SEE MATCH LINE MATCH

MATCH LINE

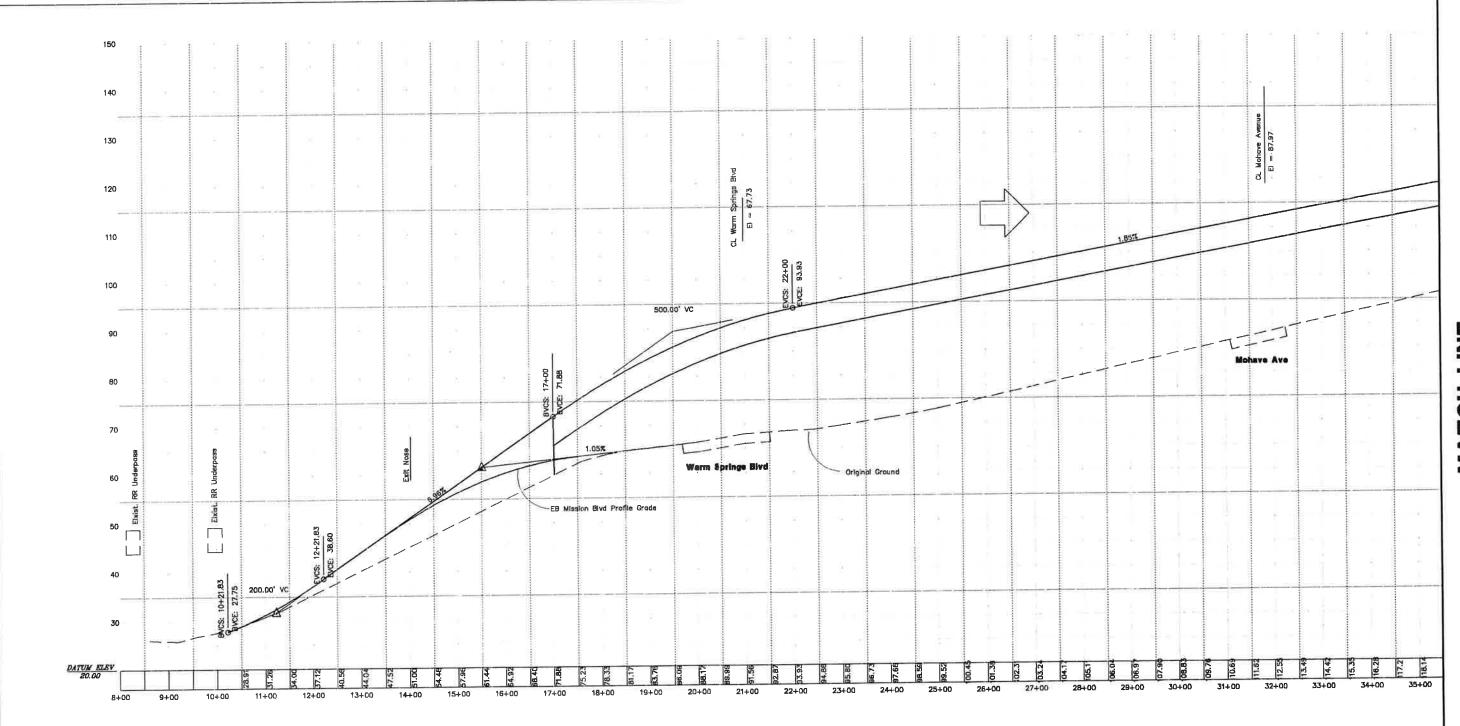
SEE





MATCH LINE

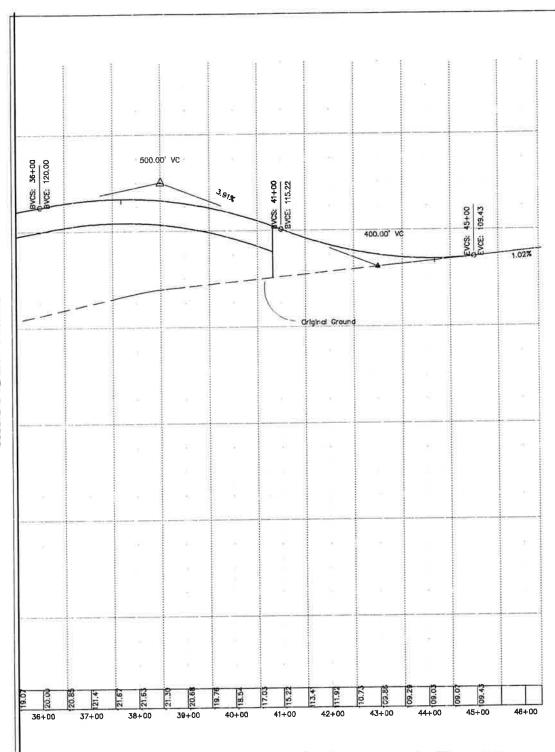
SEE L-3



EB Route 262 Viaduct Profile

Scale: Horiz 1"=200' Vert 1"=20'

RVI 60 S. Market	CONSULTING EN	Meyer GINEERS IN	c
Phone: 408.2	APPROVED ON	PROJECT NO. 97009	
DATE 11/07/97	RCE NO.	DWG NAME Mission	OF

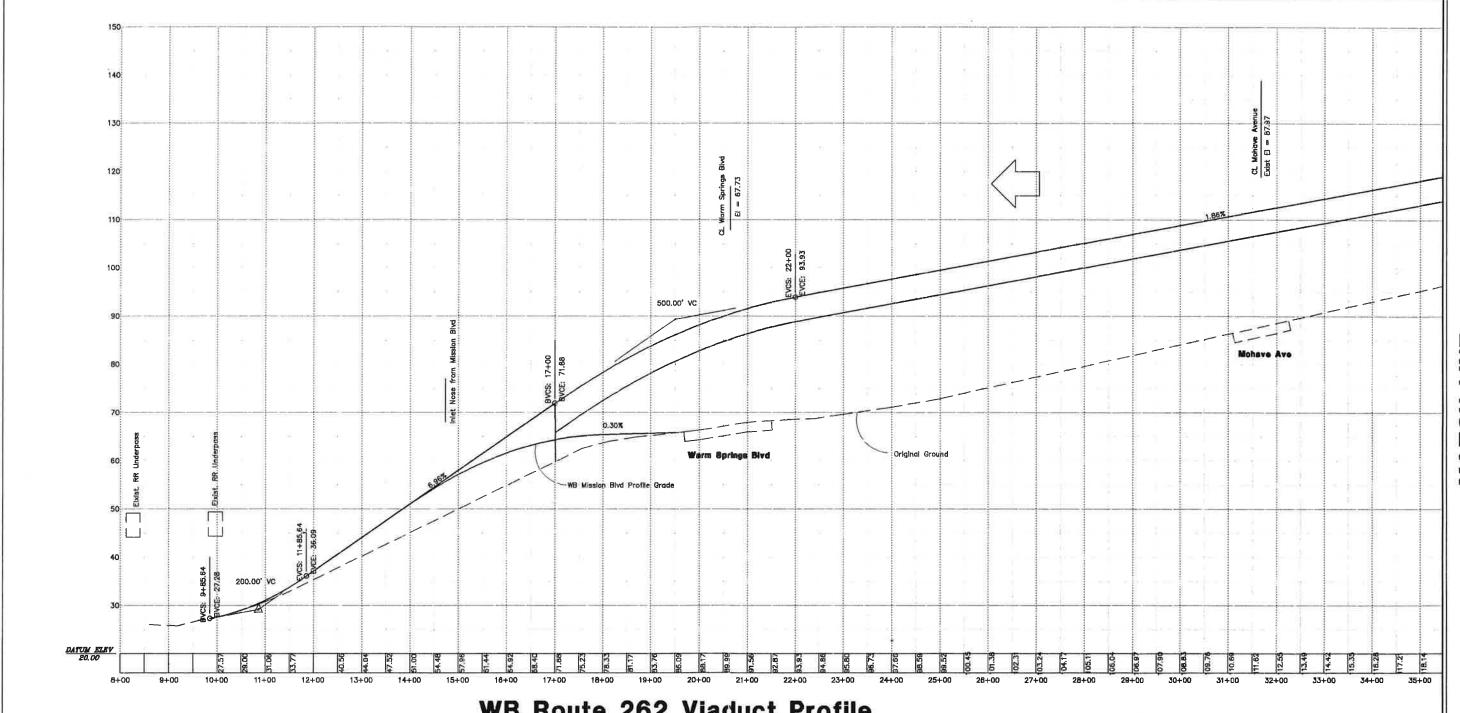


EB Route 262 Viaduct Profile

Scale: Horiz 1"=200' Vert 1"=20'



Phone: 405.20	50.2772 P	FdX: 408.200.0003		
DESIGNED BY		PROJECT NO. 97009	SHEET	
DATE	RCE NO.	DWG NAME Mission	OF	

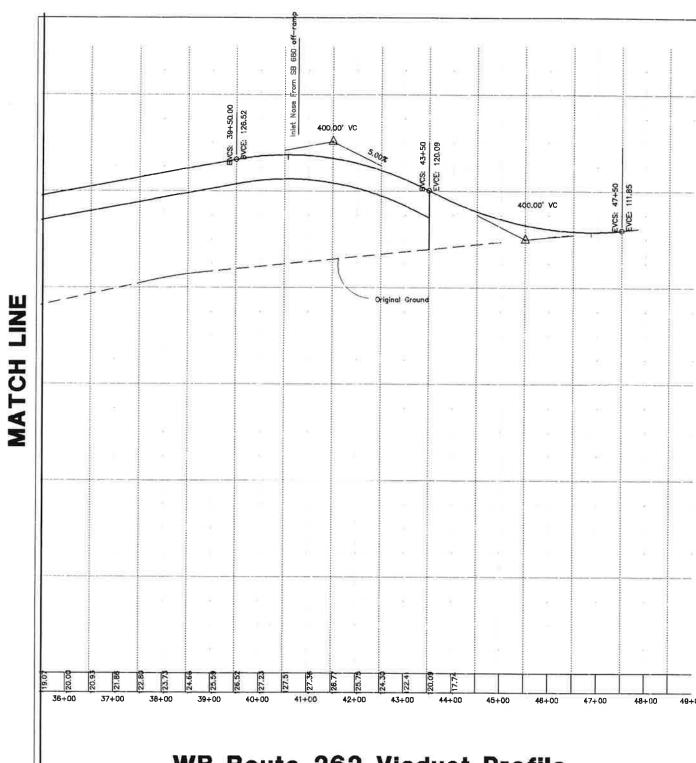


WB Route 262 Viaduct Profile

Scale: Horiz 1"=200' Vert 1"=20'



Phone: 408.2	80.2772 F	ax: 408.280.68	
DESIGNED BY CKD. BY DATE11/07/97	APPROVED ON	PROJECT NO. 97009	SHEET
	RCE NO.	DWG NAME Mission	OF

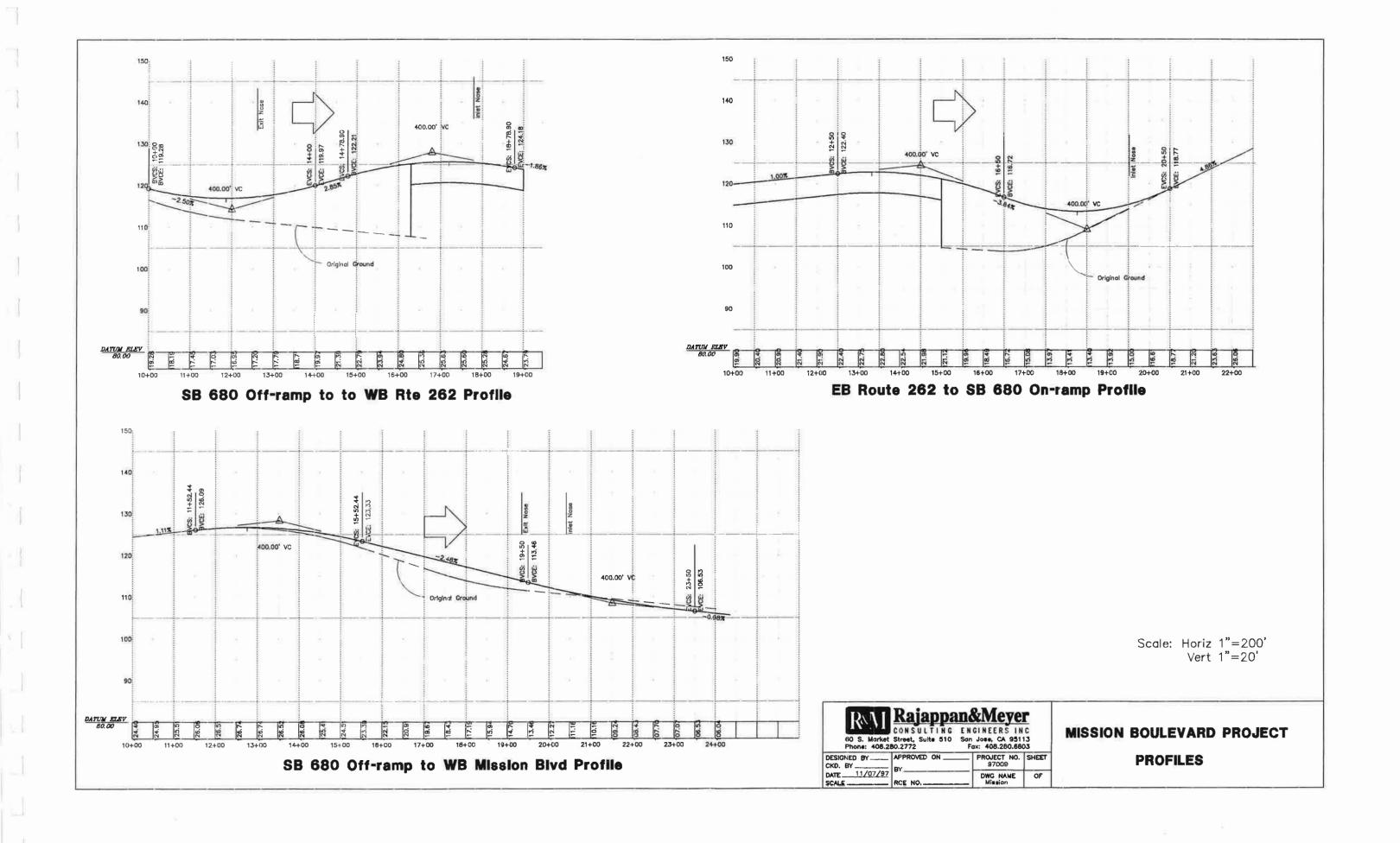


WB Route 262 Viaduct Profile

Scale: Horiz 1"=200' Vert 1"=20'



Phone: 406.20	3U.2//2	FOX: 405.280.8803		
CKD BY		PROJECT NO. 97009	SHEET	
DATE 11/07/97 SCALE	RUE NO.	DWG NAME Mission	OF	



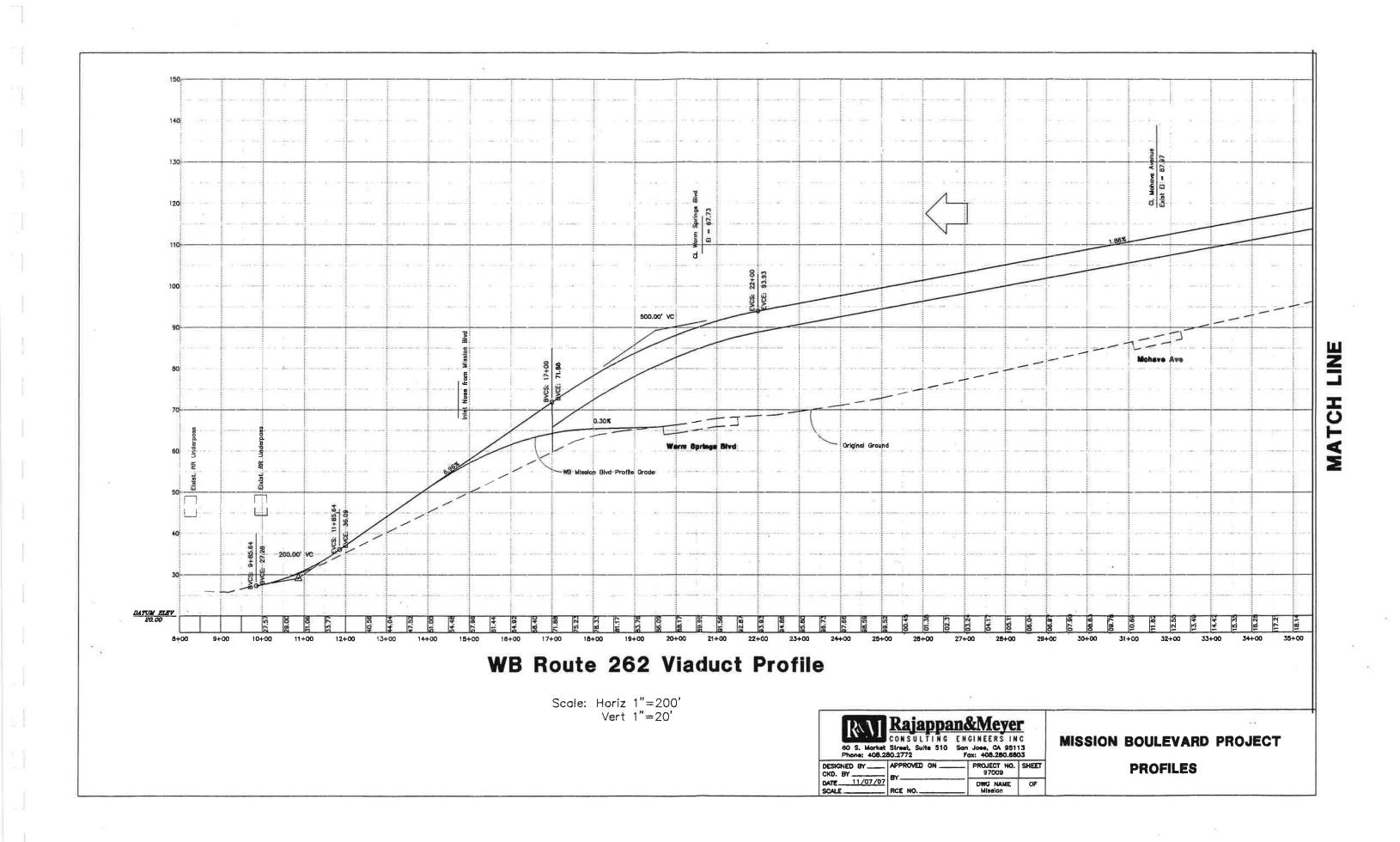
Appendix B WB Expressway Concept S

MATCH LINE

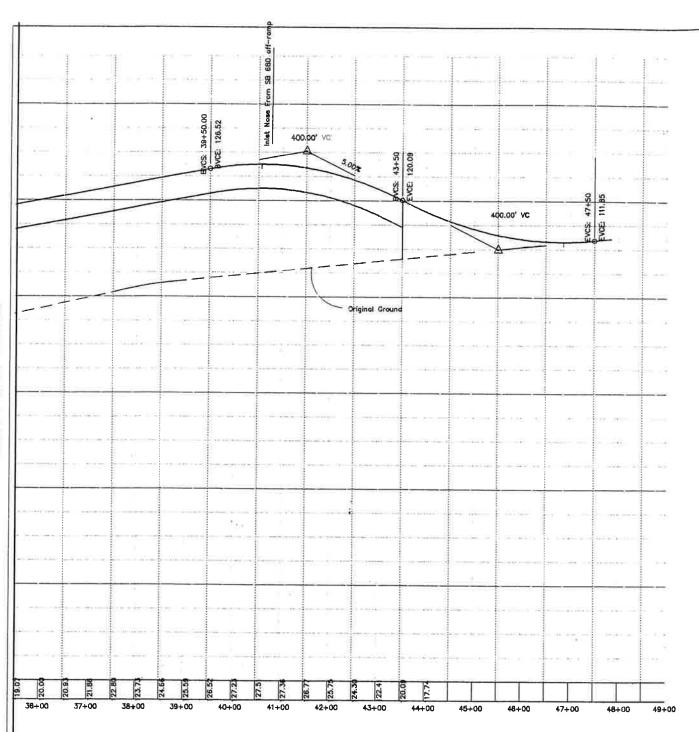




MATCH LINE SEE L-3







WB Route 262 Viaduct Profile

Scale: Horiz 1"=200' Vert 1"=20'



7 1101101 100121	20:2772	47. 400.200.000		ч
OHD DV	APPROVED ON	PROJECT NO. 97009	SHEET	
DATE 11/07/97 SCALE	RCE NO.	DWG NAME Mission	OF	

CONCEPTUAL COST ESTIMATE

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE: 26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

REV:

0

GROUP		-	GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
03	DRAINAGE DITCH 9'TOPx3'DEEP	LF	\$224.00	\$224.00		\$0
03	DRAINAGE DITCH 4'TOPx2'DEEP	LF	\$112.00	\$112.00	2,000	\$224,000
03	REINFORCED CONCRETE PIPE 18"	LF	\$67.00	\$67.00	2,000	\$134,000
03	REINFORCED CONCRETE PIPE 24"	LF	\$84.00	\$84.00		\$0
03	REINFORCED CONCRETE PIPE 36"	LF	\$112.00	\$112.00	3,500	\$392,000
03	DRAINAGE STRUCTURES	EA	\$1,720.00	\$1,720.00	70	\$120,400
	(CATCHBASINS, MANHOLES)					
03	BOX CULVERTS	LF	\$448.00	\$448.00		\$0
03	CLAY SEWER PIPE 6"	LF	\$35.00	\$35.00	500	\$17,500
03	CLAY SEWER PIPE 12'	LF	\$45.00	\$45.00	6,000	\$270,000
03		1 /	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03		1 1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03	1		\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03	ľ	1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00	1	\$0
03	L		\$0.00	\$0.00	L	\$0
TOTAL FOR ITEM 03 DRAINAGE				\$1,157,900		

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97 DH

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

0

CONTRACT NO:

R & M 97009

GROUP			GUIDE	PROPONENT		TOTAL		
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)		
04	ASPHALT CONCRETE PAVEMENT	SY	\$41.50	\$41.50	25,000	\$1,037,500		
04	PC CONCRETE PAVEMENT	SY	\$47.50	\$47.50		\$0		
04	STRIPING	LF	\$0.45	\$0.45	60,000	\$27,000		
04	MARKINGS	SF	\$3.15	\$3.15	5,000	\$15,750		
04	CURB & GUTTER	LF	\$0.00	\$15.00	15,000	\$225,000		
04	SIDEWALK	SF	\$0.00	\$5.00	27,000	\$135,000		
04		1 1	\$0.00	\$0.00		\$0		
04			\$0.00	\$0.00		\$0		
04			\$0.00	\$0.00		\$0		
04		1 1	\$0.00	\$0.00	1 1	\$0		
04	-	1 1	\$0.00	\$0.00		\$0		
04			\$0.00	\$0.00		\$0		
04		1 1	\$0.00	\$0.00		\$0		
04			\$0.00	\$0.00		\$(
04		1 1	\$0.00	\$0.00		\$(
04			\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00	1	\$		
04			\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04			\$0.00	\$0.00	1	\$		
04			\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
04		1 1	\$0.00	\$0.00		\$		
04	ľ		\$0.00	\$0.00		\$		
04			\$0.00	\$0.00		\$		
	TOTAL FOR ITEM 04 PAVEMENT							

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE CONCEPTUAL - EXPRESS LANES FROM 1-680 TO 1-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97 DH

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

0

CONTRACT NO:

R & M 97009

OBOUE		T .	GUIDE	PROPONENT		TOTAL		
GROUP	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)		
CODE	BRIDGES	SF	\$119.00	\$120.00	105,500	\$12,660,000		
05	RETAINING WALLS-UNDER 5' HIGH	LF	\$168.00	\$168.00	800	\$134,400		
05	RETAINING WALLS-ONDER 5 HIGH	LF	\$504.00	\$504.00	2,400	\$1,209,600		
05	ISOUNDWALLS	LF	\$224.00	\$224.00	1,150	\$257,600		
05	SOUNDWALLS		\$0.00	\$0.00	1,100	\$0		
05 05			\$0.00	\$0.00		\$0		
05	l.		\$0.00	\$0.00		\$0		
05 05	İ		\$0.00	\$0.00		\$0		
05 05			\$0.00	\$0.00		\$0		
05 05	7.86		\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05	l:		\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05	l.		\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05		1	\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05	1		\$0.00	\$0.00		\$0		
05			\$0.00	\$0.00		\$0		
	TOTAL FOR ITEM 05 STRUCTURES							

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE: 26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP			GUIDE	PROPONENT		TOTAL	
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998)	
06	FENCING	LF	\$18.00	\$18.00	1,500	\$27,00	
06	CONCRETE BARRIER	LF	\$80.00	\$80.00	1,200	\$96,00	
06	METAL BEAM BARRIER	LF	\$30.00	\$30.00	1,000	\$30,00	
06	TRAFFIC SIGNALS	INT	\$150,000.00	\$150,000.00	2	\$300,00	
06	LIGHTING	MI	\$166,000.00	\$166,000.00	1	\$166,00	
06	SIGNING - ON RAMP	RMP	\$4,700.00	\$4,700.00	2	\$9,40	
06	SIGNING - OFF RAMP	RMP	\$89,000.00	\$89,000.00	1	\$89,00	
06	SIGNING - ADD ROADWAY	MI	\$9,600.00	\$9,600.00	1	\$9,60	
06	TRUSS SIGNS	EA	\$38,000.00	\$38,000.00	4	\$152,00	
06	ROAD SIDE SIGNS	EA	\$356.00	\$356.00	50	\$17,80	
06	LANDSCAPING	SF	\$1.10	\$15.00	92,000	\$1,380,0	
06	HAZARDOUS MATERIAL	LS	\$0.00	\$100,000.00	2	\$200,0	
06	ENVIRONMENTAL MITIGATION	LS	\$0.00	\$100,000.00	2	\$200,0	
06	IRRIGATION SYSTEM	LS	\$0.00	\$50,000.00	4	\$200,0	
06	RAMP METERING SYSTEM	EA	\$0.00	\$80,000.00	2	\$160,0	
06	RAMP METERING SYSTEM	EA	\$0.00	\$100,000.00			
06	RAMP METERING SYSTEM	1 1	\$0.00	\$250,000.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00		;	
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06		1 1	\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
06			\$0.00	\$0.00			
TOTAL FOR ITEM 06 MISCELLANEOUS							

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL			
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$			
07	PG & E	LS	\$0.00	\$250,000.00	1	\$250,00			
07	PACIFIC BELL	LS	\$0.00	\$200,000.00	1	\$200,00			
07	RAILROAD COMPANIES	LS	\$0.00	\$0.00	1	\$			
07	SEWER	LS	\$0.00	\$0.00	1	\$6			
07	EBMUD	LS	\$0.00	\$250,000.00	1	\$250,00			
07	BART	LS	\$0.00	\$0.00	1	\$			
07	CABLE TV	LS	\$0.00	\$100,000.00	1	\$100,00			
07		LS	\$0.00		1	\$			
07									
07	MATERIAL FURNISHED BY OTHERS	LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1	\$			
07	=	LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1	1			
07		LS	\$0.00	\$0.00	1				
07		LS	\$0.00	\$0.00	1	\$			
07	l	LS	\$0.00	\$0.00	1	1			
07		LS	\$0.00	\$0.00	1	\$			
07		LS	\$0.00	\$0.00	1				
07		LS	\$0.00	\$0.00	1				
07	İ	LS	\$0.00	\$0.00	1				
07		LS	\$0.00	\$0.00	1				
07		LS	\$0.00	\$0.00	1	\$			
07	l	LS	\$0.00	\$0.00	1	1			
07		LS	\$0.00	\$0.00	1				
07	1	LS	\$0.00	\$0.00	1				
07	I	LS	\$0.00	\$0.00	1	\$			
07	1	LS	\$0.00	\$0.00	1	\$			
07	1	LS	\$0.00	\$0.00	1				
07	1	LS	\$0.00	\$0.00	1				
07	1	LS	\$0.00	\$0.00	1				
07		LS	\$0.00	\$0.00	1				
	TOTAL FOR ITEM 07 WORK BY OTHERS								

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE: 26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP	<u> </u>		GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
09	ENGINEERING STUDIES	%	4.0%	2.0%		\$641,902
09		LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$0
			1			
09	ENVIRONMENTAL STUDIES	%	5.0%	2.0%		\$641,902
09		LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$0
09	DESIGN ENGINEERING	%	10.0%	10.0%		\$3,209,511
09	DESIGN ENGINEER INTO	LS	\$0.00	\$0.00	1	\$0
09	1.65	LS	\$0.00	\$0.00	1	\$0
	SOURCE INTERNAL ENGINEERING		3.0%	3.0%		\$962,853
09	CONSTRUCTION ENGINEERING	% LS	\$0.00	\$0.00	1 1	\$0
09 09		LS	\$0.00	\$0.00		\$0
09		5	\$0.00	ψ0.00	'	•
09	CONSTRUCTION STAKING	%	2.0%	2.0%		\$641,902
09		LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$0
09	CONSTRUCTION MANAGEMENT	%	10.0%	10.0%		\$3,209,511
09	CONSTRUCTION MANAGEMENT	LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$0
		1	£0.00	\$50,000.00	1	\$50,000
09	PROJECT MANAGEMENT	LS	\$0.00 \$0.00	\$0.00	1	\$0
09 09		LS	\$0.00	\$0.00	1	\$0
09		[5]	Ψ0.00	Ψ0.00		
09	PUBLIC INFORMATION	LS	\$0.00	\$50,000.00	1	\$50,000
09	1	LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$0
		AND MAN: 2	SEMENT			EO 407 EDO
	TOTAL FOR ITEM 09 ENGINEERING	AND MANA	3EMEN I			\$9,407,582

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97 DH

R & M Consulting Engineers Inc.

BY:

REV: 0

DESIGN CONSULTANT: CONTRACT NO:

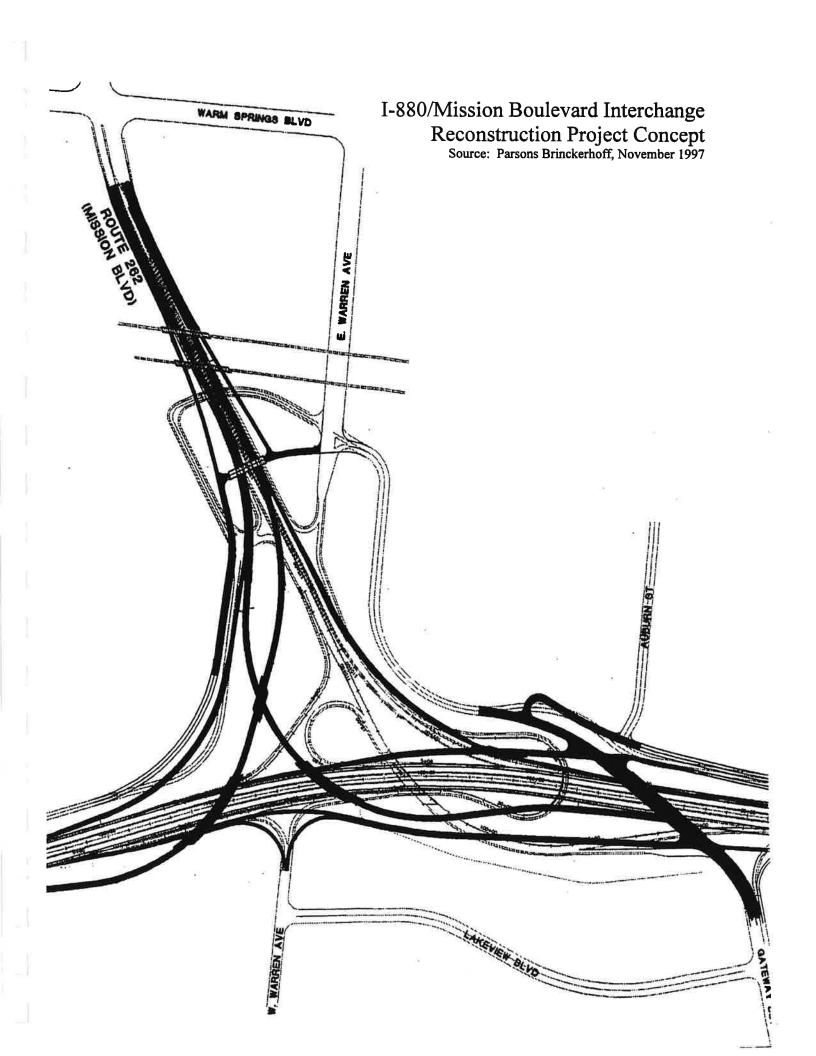
R & M 97009

TOTAL PROPONENT GUIDE GROUP QUANTITY COST (1998\$) PRICE CODE ITEM DESCRIPTION UNIT PRICE 10 LAND COST: \$680,000 \$20.00 34,000 SF \$0.00 PARCEL NO. _____ 10 \$0 PARCEL NO. LS \$0.00 \$0.00 1 10 LS \$0.00 \$0.00 1 \$0 PARCEL NO. 10 \$0 \$0.00 1 LS \$0.00 PARCEL NO. 10 \$0.00 \$0.00 1 \$0 LS 10 PARCEL NO. \$0.00 1 \$0 LS \$0.00 10 PARCEL NO. \$0 \$0.00 1 LS \$0.00 10 PARCEL NO. _____ \$0.00 1 \$0 \$0.00 LS 10 PARCEL NO. \$0 \$0.00 1 \$0.00 10 PARCEL NO. LS \$0 \$0.00 \$0.00 1 PARCEL NO. _____ LS 10 \$0 LS \$0.00 \$0.00 1 10 PARCEL NO. _____ \$0 \$0.00 1 PARCEL NO. LS \$0.00 10 \$0.00 1 \$0 LS \$0.00 PARCEL NO. 10 1 \$0 LS \$0.00 \$0.00 10 PARCEL NO. LS \$0.00 \$0.00 1 \$0 PARCEL NO. 10 10 RELOCATIONS: PARCEL NO. _____ \$200,000 \$0.00 \$200,000.00 1 LS 10 \$0 \$0.00 \$0.00 1 LS 10 \$0 \$0.00 1 10 LS \$0.00 PARCEL NO. _____ LS \$0.00 \$0.00 1 \$0 10 PARCEL NO. \$0.00 1 \$0 \$0.00 10 PARCEL NO. LS \$0 \$0.00 PARCEL NO. LS \$0.00 10 \$0.00 1 \$0 PARCEL NO. _____ LS \$0.00 10 LS \$0.00 \$0.00 1 \$0 10 PARCEL NO. \$20,000 \$0.00 \$20,000.00 1 ACQUISITION SERVICES LS 10 \$150,000 \$0.00 \$150,000.00 1 R.O.W. ENGINEERING LS 10 \$0.00 1 \$0 LS \$0.00 10 UTILITY RELOCATIONS HAZARDOUS MATERIAL REMEDIATION LS \$0.00 \$0.00 \$0 10 \$1,050,000 SUBTOTAL 0.00% \$0 % 0.00% 10 CONTINGENCY

\$1,050,000

TOTAL FOR ITEM 10 LAND AND RIGHT-OF-WAY

Appendix C I-880/Mission Concept



September 30, 1997

Mr. Keith Meyer, P.E. Rajappan and Meyer 60 S. Market Street, Ste 510 San Jose, CA 95113

Re: Year 2010 Volumes on Route 262 in Fremont

Dear Mr. Meyer:

This is to present the revised findings of TJKM for the Rt. 262 (Mission Boulevard) traffic forecasts. The information in this letter supersedes the material in the letter of August 26, 1997 on the same subject. The purpose of our studies was to develop future year traffic volumes upon which to base a design for enhanced capacity for the Rt. 262 corridor between I-680 and I-880 in the City of Fremont.

In the first exercise, we utilized the existing City of Fremont MINUTP model to develop the year 2010 forecasts. This was thought to be the best model to develop intersection-level forecasts for the corridor. There are two existing signalized intersections in the portion of Mission Boulevard between I-680 and I-880 -- Mission Boulevard at Mohave Drive and Mission Boulevard at Warm Springs Boulevard. Since the earlier effort, we have obtained existing count information for the I-880/Rt. 262 interchange complex and have obtained forecasts from the Alameda County CMA model.

After comparing the previous forecasts with existing volumes and with forecasts obtained from the CMA model, we found it necessary to take information from both models and do manual adjustments to provide forecasts that are reasonable. Intersection counts obtained from the City indicate that Mission Boulevard/Mohave Drive currently operates at LOS E in the p.m. period while Mission Boulevard/Warm Springs Boulevard operates at LOS D in the p.m. Our observations, however, indicate that the intersections frequently are jammed so the calculated level of service ratings may be misleading. The existing ratings are attached.

We used the models to determine the amount of "through" traffic, defined in this case as traffic that travels from or beyond I-680 on the east to west of Warm Springs Boulevard. We also compared the forecasted "through" traffic with existing through traffic, which can be closely estimated from current counts. Figures 1 and 2 show all 2010 peak hour traffic in the Mission Boulevard corridor. The volumes include local traffic on Mission Boulevard as well as the through traffic during both the a.m. and p.m. periods. On the east end, the numbers indicate whether the trip uses I-680 north, I-680 south, or Mission Boulevard east of I-680. The results show peak directional volumes of 2,500 westbound in the morning and 2,250 eastbound in the evening. These volumes will work well with the proposed four-lane overhead connector, two in each direction, to serve through traffic.

The remaining volumes were evaluated to determine what at-grade local street system would be necessary to serve the two intersections and intervening land uses. With two lanes in each direction for through traffic on Mission Boulevard, including the use of the outer lane for right

tums at intersections, and separate left-tum lanes at the signalized intersections, both intersections will operate at LOS D or better during peak periods under 2010 volumes. At Warm Springs Boulevard, two left-turn lanes on Mission Boulevard are required in both directions of Mission Boulevard, while at Mohave Drive only one left-turn lane is required in each direction. Required lane patterns for the side streets do not exceed existing lanes and are indicated in the attached calculation sheets.

This exercise is intended to show the lane requirements for a proposed I-680/I-880 connector and to ensure that the local street system can function satisfactorily. We believe we have provided the required information. However, because the numbers are based on combinations of output from two very diverse models, coupled with hand adjustments and close comparison with existing patterns, the numbers cannot be considered as final. Perhaps the City of Fremont model which is under preparation will yield forecasts which require less adjustments. However, because of the process utilized and because the proposed four through lane concept would provide ample excess capacity, we are confident that the new numbers are "order of magnitude" results which are quite satisfactory to answer the questions at hand.

In summary, the proposed four-lane connector flyover provides sufficient capacity and the atgrade portion of the design requires two through lanes in each direction plus left-turn lanes at the two signalized intersections. Please let me know if additional information is required.

Very truly yours,

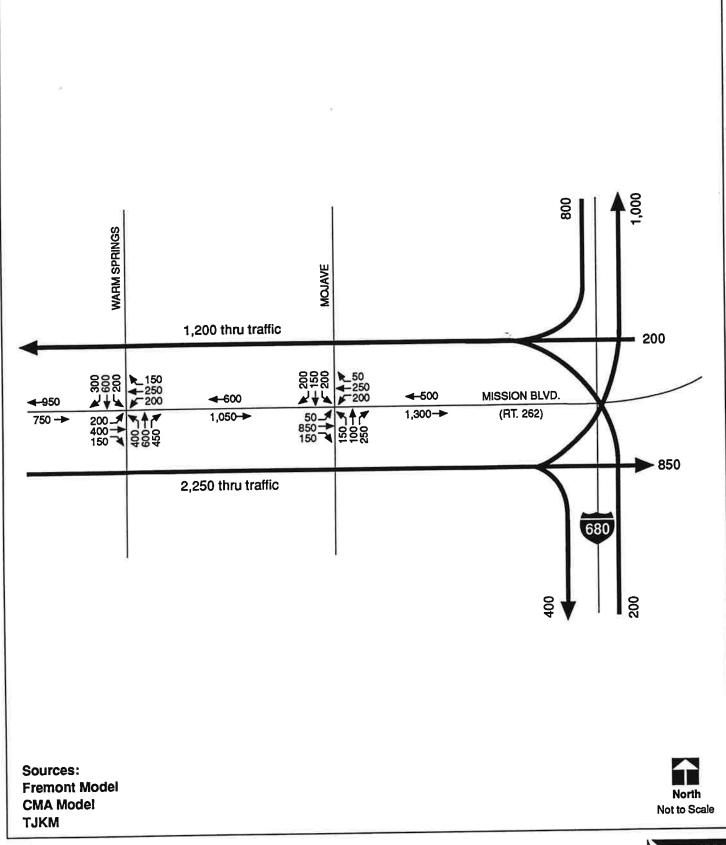
Chris D. Kinzel, P.E.

Chris D. Kingel

President

rhm Attachr

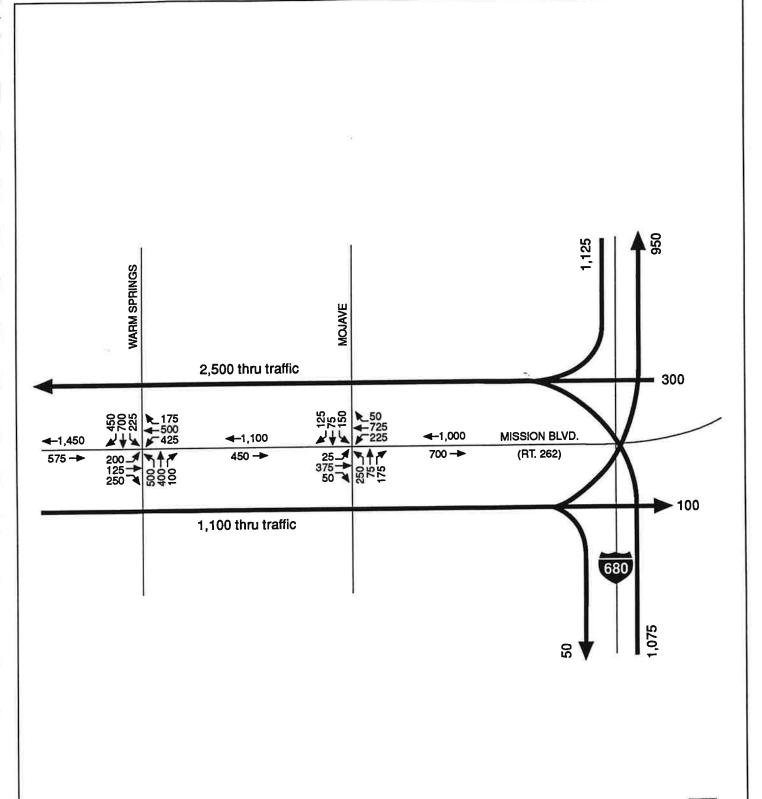
Attachments 014-0841.3ck



PM Peak Hour Year 2010 Volumes on Route 262

Figure





Sources: Fremont Model CMA Model TJKM



AM Peak Hour Year 2010 Volumes on Route 262

Figure



LOS Software by TJKM Transportation Consultants

Condit	ion: EXISI	ING	(MA)		52000000000					08/26/97
INTERS Count	======= ECTION Date	1	WARM SI		BL/M1	SSION	BLVD		CITY ak Hour	FREMONT
TJKM M	ETHOD .	•	1	THRU 710	168	^				
LEFT THRU	142 785>	2.0 3.0						151	RIGHT	REET NAME: SSION BLVD
RIGHT	236	1.0	2.0	2.0	1.0	2.0 - J		394	LEFT	
W + E S	v		504 LEFT	317 THRU	83 RIGHT	Split?	Y			 G WARRANTS: Urb=Y, Rur=Y

STREET NAME: WARM SPRINGS BL

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C	
NB	RIGHT (R) THRU (T) LEFT (L)	83 317 504	0 * 317 504	1620 3500 3000	0.0000 0.0906 0.1680	0.1680	8.
SB	RIGHT (R) THRU (T) LEFT (L)	439 710 168	341 * 710 168	1620 3500 3000	0.2105 0.2029 0.0560	0.2105	
EB	RIGHT (R) THRU (T) LEFT (L)	236 785 142	40 * 785 142	1620 5250 3000	0.0247 0.1495 0.0473	0.0473	
WB	RIGHT (R) THRU (T) LEFT (L)	131 2024 394	26 * 2024 394	1620 5250 3000	0.0160 0.3855 0.1313	0.3855	: T T T T T T T T T T T T T T T T T
===	VOLUME-TO ADJUSTMEN TOTAL VOI	0.81 0.05 0.86	,				

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST.INT, VOL=EXIST.AMV, CAP=D:..FREMNEW.TAB

LOS Software by TJKM Transportation Consultants

Condit	ondition: EXISTING (PM)									08/26/97		
INTERS Count	ECTION Date	1	1 WARM SPRINGS BL/MISSION BLVD Time						CITY OF FREMONT Peak Hour			
LEFT	209 1508		2.0	1.0	357 	204	Sp 1.0 3.0<		N RIGHT THRU	STREET NAME: Mission blvd		
RIGHT W + E		ļ	1.0	2.0 < 334 LEFT	802	408	2.0 V Split? Y	191	LEFT	SIG WARRANTS: Urb=Y, Rur=Y		

STREET NAME: WARM SPRINGS BL

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	408 802 334	296 * 802 334	1620 3500 3000	0.1827 0.2291 0.1113	0.2291
SB	RIGHT (R) THRU (T) LEFT (L)	197 357 204	81 * - 357 204	1620 3500 3000	0.0500 0.1020 0.0680	0.1020
EB	RIGHT (R) THRU (T) LEFT (L)	142 1508 209	0 * 1508 209	1620 5250 3000	0.0000 0.2872 0.0697	0.2872
WB	RIGHT (R) THRU (T) LEFT (L)	133 984 191	18 * 984 191	1620 5250 3000	0.0111 0.1874 0.0637	0.0637
===	VOLUME-TO ADJUSTMEN TOTAL VOL INTERSECT	0.68 0.10 0.78 C				

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST.INT, VOL=EXIST.PMV, CAP=D:..FREMNEW.TAB

LOS Software by	TJKM Transportation C	:======================================
Condition: EXIST	ING (AM)	08/26/97
INTERSECTION Count Date	2 MOHAVE DRIVE/MISSI Time	ON BLVD CITY OF FREMONT Peak Hour
TJKM METHOD	RIGHT THRU LEFT 66 56 129	^
LEFT 20 THRU 1021>	1.0 1.0 1.0 1.0 2.0 (NO. OF LANES)	STREET NAME:
RIGHT 54 V	1.9 1.0 1.0 1.0> ^> 176 56 140 LEFT THRU RIGHT	 V SIG WARRANTS: Urb=Y, Rur=Y

STREET NAME: MOHAVE DRIVE

===	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	140 56 176	0 * 56 176	1620 1750 1620	0.0000 0.0320 0.1086	0.1086
SB	RIGHT (R) THRU (T) LEFT (L)	66 56 129	0 * 56 129	1620 1750 1620	0.0000 0.0320 0.0796	0.0796
EB	RIGHT (R) THRU (T) LEFT (L)	54 1021 20	54 1021 20	1650 3500 1620	0.0327 0.2917 0.0123	0.0123
WB	RIGHT (R) THRU (T) LEFT (L) T + R	59 2322 221	59 2322 221 2381	1620 5120 1620 5120	0.0364 0.4535 0.1364 0.4650	0.4650
=31	VOLUME-TO ADJUSTMEI TOTAL VOI INTERSEC	0.67 0.10 0.77 C				

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST.INT, VOL=EXIST.AMV, CAP=D:..FREMNEW.TAB

LOS Software by TJKM Transportation Consultants

Condition: EXIST	ING (PM)	08/26/97
INTERSECTION Count Date	2 MOHAVE DRIVE/MISSION BLVD CITY Time Peak Hour	OF FREMONT
TJKM METHOD	RIGHT THRU LEFT 23 114 206	
THRU 2152>		STREET NAME: MISSION BLVD
RIGHT 95 V W + E S	1.9 1.0 1.0 1.0 1.0 197 LEFT ^> 112 95 252 LEFT THRU RIGHT Split? Y	SIG WARRANTS: Urb=Y, Rur=Y

STREET NAME: MOHAVE DRIVE

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	252 95 112	94 * 95 112	1620 1750 1620	0.0580 0.0543 0.0691	0.0691
SB	RIGHT (R) THRU (T) LEFT (L)	23 114 206	0 * 114 206	1620 1750 1620	0.0000 0.0651 0.1272	0.1272
EB	RIGHT (R) THRU (T) LEFT (L)	95 2152 20	95 2152 20	1650 3500 1620	0.0576 0.6149 0.0123	0.6149
WB	RIGHT (R) THRU (T) LEFT (L) T + R	32 1005 197	32 1005 197 1037	1620 5120 1620 5120	0.0198 0.1963 0.1216 0.2025	0.1216
222	ADJUSTMENTOTAL, VOI	NT FOR LOST LUME-TO-CAP	RATIO FOR T YELLOW TIM ACITY RATIO OF SERVICE:	E:	TION:	0.93 0.05 0.98 E

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST.INT, VOL=EXIST.PMV, CAP=D:..FREMNEW.TAB

LOS Software	bv e	TJKM	Transportation	Consultants
--------------	------	------	----------------	--------------------

Condit	ion: 2010	WITH CONN	ECTOR (AM)			09/30/97
INTERS Count		1 WARM S	PRINGS BL/MI Time	SSION BLV	D CITY Peak Hou	OF FREMONT
TJKM M	ETHOD .	450	ĪĪ	^ -	I SAR N	
LEFT THRU			2.0 2.0 OF LANES)		lit? N 175 RIGHT 500 THRU	STREET NAME: MISSION BLVD
RIGHT	1	1.1 2.0	2.0 1.0	2.0	425 LEFT	
W + E S	V	500 LEFT		Split? Y		SIG WARRANTS: Urb=Y, Rur=Y

STREET NAME: WARM SPRINGS BL

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	100 400 500	0 * 400 500	1620 3500 3000	0.0000 0.1143 0.1667	0.1667
SB	RIGHT (R) THRU (T) LEFT (L)	450 700 225	336 * 700 225	1620 3500 3000	0.2074 0.2000 0.0750	0.2074
EB	RIGHT (R) THRU (T) LEFT (L) T + R	250 125 200	250 125 200 375	1620 3370 3000 3370	0.1543 0.0371 0.0667 0.1113	0.1543
WB	RIGHT (R) THRU (T) LEFT (L) T + R	175 500 425	175 500 425 675	1620 3370 3000 3370	0.1080 0.1484 0.1417 0.2003	0.1417
===	ADJUSTME	NT FOR LOST	RATIO FOR T YELLOW TIM ACITY RATIO		TION:	0.67 0.10 0.77

INTERSECTION LEVEL OF SERVICE:

LOS Software by TJKM Transportation Consultants

Condition: 20	0 WITH CONNECTOR (PM)	09/30/97
INTERSECTION Count Date	1 WARM SPRINGS BL/MISSION BLVD C Time Peak	ITY OF FREMONT
TJKM METHOD	RIGHT THRU LEFT 300 600 200	
LEFT 200 THRU 400		GHT STREET NAME: IRU MISSION BLVD
RIGHT 150	- 1.1 2.0 2.0 1.0 2.0 200 LE	EFT
W + E S	400 600 450 LEFT THRU RIGHT Split? Y	SIG WARRANTS: Urb=Y, Rur=Y
	STREET NAME: WARM SPRINGS BL	

CTDEET	NAME .	UADM	SPRINGS	RI
SIRFEL	NAME:	MAKE	SPRINGS	DL

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	450 600 400	336 * 600 400	1620 3500 3000	0.2074 0.1714 0.1333	0.2074
SB	RIGHT (R) THRU (T) LEFT (L)	300 600 200	186 * 600 200	1620 3500 3000	0.1148 0.1714 0.0667	0.1714
EB	RIGHT (R) THRU (T) LEFT (L) T + R	150 400 200	150 400 200 550	1620 3370 3000 3370	0.0926 0.1187 0.0667 0.1632	0.1632
WB	RIGHT (R) THRU (T) LEFT (L) T + R	150 250 200	150 250 200 400	1620 3370 3000 3370	0.0926 0.0742 0.0667 0.1187	0.0667
===	ADJUSTME	NT FOR LOST LUME-TO-CAP	RATIO FOR T YELLOW TIM ACITY RATIO OF SERVICE:	E:	TION:	0.61 0.10 0.71 c

* ADJUSTED FOR RIGHT TURN ON RED INT=2010WC.INT, VOL=2010WCRE.PMV, CAP=D:..FREMNEW.TAB

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=2010WC.INT, VOL=2010WCRE.AMV, CAP=D:..FREMNEW.TAB

LOS Software by	TJKM Transportation Consu	l tants
Condition: 2010	WITH CONNECTOR (AM)	09/30/97
INTERSECTION Count Date	2 MOHAVE DRIVE/MISSION B Time	LVD CITY OF FREMONT Peak Hour
TJKM METHOD	RIGHT THRU LEFT 125 75 150 	
LEFT 25	y> 1.0 1.1 1.1 1.0 1.1	Split? N 50 RIGHT
THRU 375>	2.1 (NO. OF LANES) 2.1	STREET NAME: < 725 THRU MISSION BLVD
05 TEDIN	1.1 1.0 1.1 1.1 1.0	225 LEFT
N W + E S	250 75 175 LEFT THRU RIGHT Spli	SIG WARRANTS: Urb=Y, Rur=Y

STREET NAME: MOHAVE DRIVE

===	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C	
NB	RIGHT (R) THRU (T) LEFT (L) T + R	175 75 250	175 75 250 250	1620 1620 1620 1620	0.1080 0.0463 0.1543 0.1543	0.1543	
SB	RIGHT (R) THRU (T) LEFT (L) T + R	125 75 150	125 75 150 200	1620 1620 1620 1620	0.0772 0.0463 0.0926 0.1235	0.1235	
EB	RIGHT (R) THRU (T) LEFT (L) T + R	50 375 25	50 375 25 425	1620 3370 1620 3370	0.0309 0.1113 0.0154 0.1261	0.1261	
WB	RIGHT (R) THRU (T) LEFT (L) T + R	50 725 225	50 725 225 775	1620 3370 1620 3370	0.0309 0.2151 0.1389 0.2300	0.1389	
	ADJUSTME	NT FOR LOST LUME-TO-CAP	RATIO FOR T YELLOW TIM ACITY RATIO OF SERVICE:	E:	TION:	0.54 0.10 0.64 B	

LOS Software by TJKM Transportation Consultants

Condit	ion: 2010	WITH	CONNE	CTOR	(PM)				09/30/97
INTERS Count	ECTION Date	2 M	OHAVE		/MISSI me	ON BLVD	Pe	CITY ak Hou	OF FREMONT
TJKM M	ETHOD		RIGHT 200	THRU 150	200	^	1:40		
LEFT THRU	50>	1.0 2.1			1.0 NES)	1.1 2.1<	50 250	RIGHT THRU	STREET NAME: MISSION BLVD
RIGHT W + E S	150 	1.1	1.0 < 150 LEFT	Î 100	250	1.0 V Split? Y	200	LEFT	SIG WARRANTS: Urb=Y, Rur=Y

STREET NAME: MOHAVE DRIVE

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
₹B	RIGHT (R) THRU (T) LEFT (L) T + R	250 100 150	250 100 150 350	1620 1620 1620 1620	0.1543 0.0617 0.0926 0.2160	0.2160
SB	RIGHT (R) THRU (T) LEFT (L) T + R	200 150 200	200 150 200 350	1620 1620 1620 1620	0.1235 0.0926 0.1235 0.2160	0.2160
EB	RIGHT (R) THRU (T) LEFT (L) T + R	150 850 50	150 850 50 1000	1620 3370 1620 3370	0.0926 0.2522 0.0309 0.2967	0.2967
WΒ	RIGHT (R) THRU (T) LEFT (L) T + R	50 250 200	50 250 200 300	1620 3370 1620 3370	0.0309 0.0742 0.1235 0.0890	0.1235
22.5	ADJUSTME	NT FOR LOST LUME-TO-CAP	RATIO FOR T YELLOW TIM ACITY RATIO OF SERVICE:	E:	TION:	0.85 0.05 0.90 D

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=2010WC.INT, VOL=2010WCRE.PMV, CAP=D:..FREMNEW.TAB

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=2010WC.INT, VOL=2010WCRE.AMV, CAP=D:..FREMNEW.TAB

MEMO

November 6, 1997

Project No.: 14-084

To:

Keith Meyer, P.E.

From:

Chris D. Kinzel

Subject:

Additional Traffic Scenarios on Route 262 in Fremont

Fax:510-463-3690

As you requested, TJKM ran additional level of service calculations for the two Mission Boulevard intersections with Warm Springs Boulevard and Mohave Drive. In all new scenarios, we used the 2010 volumes we compiled earlier based on our interpretation of both the Alameda County CMA model and the City of Fremont MINUTP model.

At the present time, there are three through lanes on Mission Boulevard at Warm Springs Boulevard in both the eastbound and westbound directions. At Mohave Drive, there are three westbound lanes and two eastbound lanes.

In order to examine the effects of additional lanes at both intersections, we calculated the intersection volume to capacity ratios with three through lanes in both directions and also with four through lanes in both directions. The results are as follows:

	Current La	anes	Three Thro	ugh Lanes	Four Thro	ugh Lanes
	A.M	P.M.	A.M.	P.M.	A.M.	P.M.
Mission and	1.06	1.00	1.06	1.00	0.92	0.87
Warm Springs	F	E	F	É	E	D
Mission and	0.95	1.28	0.95	0.98	0.82	0.84
Mohave	E	F	E	E	D	D

Again, all evaluations are based on 2010 volumes. Please contact me if there are questions about this information. I have attached the calculation sheets.

\97proj\014-084m.3ck

~

Cone	dition: 2010	WITH EXIS	TING LANE GE	ONETRIES	(AH)	11/05/97
	ERSECTION nt Date	1 WARN S	PRINGS BL/MI Time	ISSION BLV	CITY Peak Hour	OF FREMONT
•••	N METHOD .	450	THRU LEFT 700 225	^ Sp	Lit? N	
LEF TWR					175 RIGHT 3000 THRU	STREET NAME: MISSION BLYD
RIG N + S	E	500	2.0 1.0 ^> 400 100 THRU RIGHT	ļ	425 LEFT	SIG WARRANTS: Urb=Y, Rur=
		STREET HAN	E: WARM SPR	INGS BL		
	MOYEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	100 400 500	0 * 400 500	1620 3500 3000	0.0000	0.1667
SB	RIGHT (R) THRU (T) LEFT (L)	450 700 225	336 * 700 225	1620 3500 3000	0.2074 0.2900 0.0750	0.2074

	THRU (T) LEFT (L)	400 500	400 500	3000 3000	0.1667	0.1667	
SB	RIGHT (R) THRU (T) LEFT (L)	450 700 225	336 * 700 225	1620 3500 3000	0.2974 0.2900 0.0750	0.2074	
EB	RIGHT (R) THRU (T) LEFT (L)	250 1225 200	55 * 1225 200	1620 5250 3000	0.0340 0.2333 0,0667	0.0667	
WB	RIGHT (R) THRU (T) LEFT (L)	175 3000 425	54 * 3000 425	1620 5250 3000	0.0333 0.5714 0.1417	0.5714	
===	AD JUSTNEN? TOTAL VOLU	FOR LOST UME-TO-CAP	RATIO FOR THE YELLOW TIME: ACITY RATIO: OF SERVICE:	(NTERSE	CTION:	1.01 0.05 1.06 F	
-		ALAUT TIM	U AN BED			1892	100

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST_INT, VOL=2010R11_AMY, CAP=0:..FREMMEW.TAB

Condition: 2010 WITH EXISTING LANE GEOMETRIES (PM) CITY OF FREMONT 1 WARM SPRINGS BL/MISSION BLVD INTERSECTION Peak Hour Count Date Time RIGHT THRU LEFT TJIM METHOD 300 600 200 Split? H --- 150 RIGHT 1.0 2.0 2.0 200 --- 2.0 LEFT STREET NAME: 3.0<--- 1450 THRU MISSION BLVD 2650 ---> 3.0 (NO. OF LANES) 2.0 --- 200 LEFT RIGHT 150 --- 1.0 2.0 2.0 1.0 SIG HARRANTS: Urb=Y, Rur=Y 400 600 450 W + E LEFT THRU RIGHT Split? Y S STREET NAME: WARM SPRINGS BL V/C CRITICAL ORIGINAL. **ADJUSTED** Y/C **VOLUME*** CAPACITY RATIO VOLUME NOVEMENT 0.2074 0.2074 450 336 * 1620 NB RIGHT (R) 600 3500 600 0.1714THRU (T) 3000 LEFT (L) 400 400 0.1333 186 * 1620 0.1148 300 SB RIGHT (R) 3500 0.1714 0.1714 THRU (T) 600 600 3000 0.0667 200 200 LEFT (L) 0.0000 0 * 1620 150 EB RIGHT (R) 0.5048 0.5048 2650 5250 THRU (T) 2650 200 3000 0.0667 LEFT (L) 200 0.0222 36 * 1620 RIGHT (R) 150 0.2762 5250 THRU (T) 1450 1450 3000 0.0667 0.0667 200 200 LEFT (L) VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 0.95 0.05 ADJUSTMENT FOR LOST YELLOW TIME: 1.00 TOTAL VOLUME-TO-CAPACITY RATIO: Ε INTERSECTION LEVEL OF SERVICE:

LOS Software by TJKM Transportation Consultants

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST_INT, VOL=2010R11.PNV, CAP=D:..FRENNEW.TAB

Condition: 2010		********	ERRESTEERS:	PEREFERENCE	OF FORWARD
INTERSECTION Count Date	2 MOHAVE	DRIVE/MISSI Time	IOM BLAD	Peak Hour	OF FREMONT
TJKM METHOD	125	THRU LEFT 75 150 V> 1.0 1.0	^ \$ pl	it? N	
THRU 1475	> 2.0 (NO.	OF LANES)	3.1< 3	225 THRU	STREET NAME: MISSION BLVD
RIGHT 50	1.9 1.0	1.0 1.0	1.0	225 LEFT	
N + E	250	75 175 THRU RIGHT	Solit? Y		SIG WARRANTS: Urb=Y, Rur=

STREET HAME: MOHAVE DRIVE	STREET	HANE:	MOHAVE	DRIVE
---------------------------	--------	-------	--------	-------

	MOVEMENT	ORIGINAL VOLUME	ADJUSTED VOLUME*	CAPACITY	Y/C RATIO	ORITICAL V/C
NB	RIGHT (R) THRU (T) LEFT (L)	מו מ מ מנט	3 * 75 250	1620 1750 1620	0.0019 0.0429 0.1543	0.1543
SB	RIGHT (R) THRU (T) LEFT (L)	125 75 150	53 * 75 150	1620 1750 1620	0.0327 0.0429 0.0926	0.0926
EB	RIGHT (R) THRU (T) LEFT (L)	50 1475 25	50 1475 25	1650 3500 1620	0.0303 0.4214 0.0154	0.0154
UB	RIGHT (R) THRU (T) LEFT (L) T + R	50 3225 225	50 3225 225 3275	1620 5120 1620 5120	0.0309 0.6299 0.1389 0.6396	0,6396
34	ADJUSTME	HT FOR LOST	RATIO FOR T YELLOW TIN PACITY RATIO OF SERVICE:	E:	TIOM:	0.90 0.05 0.95 E

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST, INT, VOL=2010R11.AMV, CAP=D:..FREMMEW.TAB

LOS Software by TJKM Transportation Consultants Condition: 2010 WITH EXISTING LAME GEOMETRIES (PM) 11/05/97 CITY OF FREMONT 2 MOHAVE DRIVE/MISSION BLVD INTERSECTION Peak Hour 11me Count Date --------RIGHT THRU LEFT TJICH METHOD 200 150 200 Split? N 50 RIGHT 1.0 1.0 1.0 1.0 THRU 3100 ---> 2.0 (NO. OF LANES) 3.1<--- 1450 THRU MISSION BLVD 1.0 --- 200 LEFT RIGHT 150 --- 1.9 1.0 1.0 1.0 <---SIG WARRANTS: Urb≃Y, Rur≖Y 150 100 250 W+E LEFT THRU RIGHT Split? Y STREET NAME: MOHAVE DRIVE Y/C CRITICAL OREGINAL ADJUSTED RATIO V/C CAPACITY YOLUME **VOLUNE*** HOVEHENT 1620 0.0556 250 90 # HB RIGHT (R) 1750 0.0571 100 100 THRU (T) 0.0926 0.0926 150 150 1620 LEFT (L) 115 * 1620 0.0710 200 RIGHT (R) 1750 0.0857 THRU (T) 150 150 0.1235 0.1235200 1620 200 LEFT (L) 0.0909 1650 150 150 EB RIGHT (R) 3500 0.8857 0.8857 THRU (T) 3100 3100 1620 0.0309 50 LEFT (L) 50 1620 0.0309 50 50 RIGHT (R) 0.2832 1450 5120 1450 THRU (T) 0.1235 0.1235 200 200 1620 LEFT (L) 0.2930 1500 5120 T + R VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION: 1.23

0.05

1.28

ADJUSTMENT FOR LOST YELLOW TIME:

TOTAL VOLUME-TO-CAPACITY RATIO: INTERSECTION LEVEL OF SERVICE:

^{*} ADJUSTED FOR RIGHT TURN ON RED INT=EXIST_INT, VOL=2010R11.PMV, CAP=D:..FRENNEW.TAB

CITY OF FRENCHT IK HOUR RIGHT STREET MANE: THRU MISSION BLVD LEFT SIG LARRANTS: Urb=Y, Rur=Y	INTERSECTION COUNT Date 1 JICH METHOD LEFT 200 THRU 2650 RIGHT 150 RIGHT 550 RIGHT 550 S S S S S S S S S S S S S S S S S S	# : PM	1 WARN SPRINGS BL/MISSION BLVD Time Time RIGHT TNRU LEFT 300 600 200	2	CITY OF FRENOMI
STREET MAME: MISSION BLVD SIG WARRANTS: Urb=Y, Rur=Y	200 200 2650 150	2.0 B.0	EFT ZOO		
STREET MAME: MISSION BLVO SIG WARRANTS: Urb=Y, Ruf=Y	2650 150	2.0			
SIG WARRANTS: Urb=Y, Rur=Y			3.04	R EGHT THRU	STREET NAME: MISSION BLVD
		1.0 2.0 2.0 4.00 4.00 6.00 LEFT THRU	2.0 1.0 2.0 600 550 THRU RIGHT SPLIT? Y	200 LEFT	SIG WARANTS: Urb=Y, Rul=¥
一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一 一		STREET NAME: MARM SPRINGS BL	WARM SPRINGS BL		
CRITICAL	MOVENENT	ORIGINAL ADJAINS VOLUE	TED CAPACITY	V/C RATIO	CRITICAL V/C
0.1667	NB RIGHT (R) THRU (T) LEFT (L)	55.00 500 500 500 500 500 500 500 500 50	6 * 1620 0 3500 0 3000	0.2074 0.1714 0.1333	0.2074
0.2074	SB RIGHT (R) THRU (T) LEFT (L)	29 8 86 88 86 88	6 * 1620 0 3500 0 3000	0.1148 0.1714 0.0667	0.1714
0.0667	EB RIGHT (R) THRU (T) LEFT (L)	150 2650 265 200 20	1620 5250 3060	0.0000	0.5048
•	UB REGHT (R) THRU (T) LEFT (L)	000	1620 10 5250 10 3000	0.0222 0.2762 0.0667	0.0667
i	VOLUME-TO ADJUSTINENT TOTAL VOLI INTERSECTI	CAPACITY RATIO F T FOR LOST YELLON THE TO-CAPACITY F TOM LEVEL OF SERV	OR THE INTERSECT IN TIME: ATTO:	T10M:	2.00 8.59.9 8.59.9
a a a w w u u w	C CRITICAL 10 V/C V/C V/C V/C V/C V/C V/C V/C V/C V/C		MB RIGHT (R) THEU (T) LEFT (L) SB RIGHT (R) THRU (T) LEFT (L) LEFT	MB RIGHT (R) THRU (T) LEFT (L) SB RIGHT (R) THRU (T) LEFT (L) LEFT	MOVEMENT CORTGINAL ADJUSTED V/C

1									HERESTER.	12252200		ZEEZZE:		
	INTERSECTION Count Date	2 HOHAYE	2 MOHAYE DRIVE/MISSION BLVD Fee	CON BALVO		E	Country	INTERSECTION Count Date		HOHAVE	DRIVE/NIS Tine	2 NOHAVE DRIVE/NISSION BLVD Time	CLTY OF Peak Hour	OF FREHONT
温	TJROR METHOD	RIGHT 125	RIGHT THRU LEFT 125 75 150				T	FJICH METHOD		RIGHT 200	RIGHT THRU LEFT 200 150 200			
LEFT	. 25 - 1 U 1475	3.0	(NO. OF LANES)	, sp 1.1 3.1<	Split? N	STREET NAME: MISSION BLVD	LEFT		·-: î	_	() 1.0 1.0 1.0 (HO. OF LAMES)	4.1.1 3.1.1	Split? W 50 RIGHT 1450 THRU	STREET NAME: MISSION BLVD
7 1 2 1 2 1 3 1 4 S 1 S 1 S 1 S 1 S 1 S 1 S 1 S 1 S 1	HT 50	1.9 1.0 250 EFF	250 75 175 170 1.0	1.0 , split? Y	225 LEFT	SIG WARRANTS: Urb=Y, Rur=Y	71634 x + x N F	T 150	 ->	1.9 1.0	•	1.0 1.0 1.0 1.0 1.0 250 1.112 Y	200 LEFT	SIG WARRANTS: Urb=Y, Ruf=Y
		STREET NAM	STREET NAME: MOHAVE DRIVE	RIVE					STI	REET NAM	STREET NAME: MONAVE DRIVE	DRIVE		
	MOVEMENT	OR 1G1 HAL VOLUME	AO JUSTED V VOLUME* CAPACITY RA	CAPACITY	Y/C RATEO	CRITICAL		MOVENENT	8	ORIGINAL	ORIGINAL ADJUSTED WOLUNE*	CAPACITY	V/C RATIO	CRITICAL V/C
豐	RIGHT (R) THRU (T) LEFT (L)	ភិភនិ	w ₹5.5% *	25.53	0.0019 0.0429 0.1543	0.1543	먚	RIGHT (R) THRU (T) LEFT (L)	gto	250 150 150	85½	25. 25. 25. 25. 25. 25. 25. 25. 25. 25.	0.0556 0.0571 0.0926	0.0926
93	RIGHT (R) THRU (T) LEFT (L)	ភិជនិ	25.25 •	<u> </u>	0.0327 0.0429 0.0926	0.0926	8	RIGHT THE C	€63	2258 250 260 260	# # #	23 25 25 25 25 25 25 25 25 25 25 25 25 25	0.0710 0.0857 0.1235	0.1235
盟	RIGHT (R) THRU (T) LEFT (L)	នជ័រ	435 3355	\$50g	0.0303 0.2810 0.0154	0.0154	£	EFT C	8 63	150 150 50 50	25. 25. 25. 25.	1650 5250 1620	0.0909	0.5905
9	RIGHT (R) THRU (T) LEFT (L) T + R	322 222 223 233 243 243 243 243 243 243	2322 2322 2322 2322 2322 2322 2322 232	525 525 525 525 525 525 525 525 525 525		:	5	RIGHT THRU C LEFT C	§63_	5 <u>2</u> 58	50 200 1500	1620 5120 1620 5120	0.0309 0.2832 0.1235 0.2930	0.1235
N N	H	VOLUME-TO-CAPACITY RATIO FOR T ADJUSTMENT FOR LOST YELLOW TIM TOTAL VOLUME-TO-CAPACITY RATIO INTERSECTION LEVEL OF SERVICE:	VOLINE-TO-CAPACITY BATIO FOR THE INTERSECTION: MOJUSTNEIN FOR LOST YELLOW TIME: TOTAL YOLLINE-TO-CAPACITY RATIO: INTERSECTION LEVEL OF SERVICE:	E INTERSE	671 08:	8.00 8.00 8.00 8.00 8.00 8.00 8.00 8.00		VOLUE ADJUS TOTAL	VOLUME-TO-CAPACITY ADJUSTMENT FOR LOST TOTAL VOLUME-TO-CAP INTERSECTION LEVEL	PACITY OR LOST -TO-CAP	VOLUME-TO-CAPACITY RATIO FOR THE ADJUSTMENT FOR LOST YELLOW TIME: TOTAL VOLUME-TO-CAPACITY RATIO: INTERSECTION LEVEL OF SERVICE:	=	ERSECTION:	

Condition: 2010 WITH LONG-TERM LAWE GEOMETRIES (PM) 11/05/97	IN EXSECTION I MOUNT STAINED BE MISSION SECTION STAINED
8	TEDATITION 1 LARGE SPETINGS BLVD CITY OF PREMOM

i book	ition: 2016	VITH LONG-	Condition: 2010 UITM 1046-TERM LAWE DECMETRIES (AN	Condition: 2010 UTM TOWS TERM LANE DECONSTRIES	(AN)	11/05/97	Condition: 2010 WITH LONG-TERN LANE GEOMETRIES (PM)	110 LITH LONG	-TERM LANE	GEOMETRIES	IES (PM)	
N S	INTERSECTION COUNT DATE	T USBY ST	1 LARM SPRINGS BL/MISSION BLVD	SSION BLVI	es #	OF FRE	INTERSECTION Count Date	1 LAZH SPRINGS 8L/M1SSION BLVD CITY OF Time Peak Hour	1 MAN SPRINGS BL/M1SSION BLVD Time	OATB HOUSE	CLTY (CITY OF FREMONT . Hour
5	LJCN WETHOD	R2GHT 450	RIGHT THRU LEFT 450 700 225 1 1 1				TJICH METHOD	TEST SOS	THRU LEFT 600 200	•		
LEFT		2.0	2.0 2.0	1.0 Sp	x	•	500	2.0	2.0 2.0	1.0 150	157 W 150 RIGHT	STREET MANE:
RIGHT RICHT S	1225 T 250 L	0. 0.	(WC. OF LANES) 4.0< 2.0 2.0 1.0 2.0 <	2.0 429 2.0 429 V	3000 THRU	MISSION BLVD SIG MARRANIS: Urb=7, Ruf=7	RIGHT 150 RIGHT 150 N N N N N N N N N N N N N N N N N N	1.0 2.0	2.0 2.0 1.0 2.0 2.0 2.0 1.0 2.0 4.00 6.00 4.50 LEFT THRU RIGHT Split? Y	2.0 y		SIG WARRANTS: Urbey, Ruf-y
		STREET INM	STREET NAME: MANN SPRINGS BL	INGS BL				STREET IN	STREET NAME: LARM SPRINGS BL	INGS BL		
	MOVEMENT	ORIGINAL	ADJUSTED VOLUME*	CAPACITY	V/C RAT10	CRITICAL V/C	MOVEMENT	ORIGIKAL VOLUME	ADJUSTED VOLUME	CAPACITY	V/C RATIO	CRITICAL V/C
· #	RIGHT (R) THRU (T) LEFT (L)	000 000 000 000 000	* 005 005 005	1620 3500 3000	0.0000 0.1143 0.1667	0.1667	NB RIGHT (R) TARU (T) LEFT (L)	65 66 65 65 65 65 65 65 65 65 65 65 65 6	* 909 * 009 * 009	33.00 3000 3000	0.2074 0.1714 0.1353	0.2074
8	RIGHT (R) THRU (T) LEFT (L)	55 55 55 55 55 55 55 55 55 55 55 55 55	338 ±	3520 3500 3000 3000	0.2074 0.2000 0.0750	0.2074	SB RIGHT (R) THRU (T) LEFT (L)	200 200 200 200 200 200 200 200 200 200	186 600 200	1620 3500 3000	0.1148 0.1714 0.0667	0.1714
5	RIGHT (R) THRU (T) LEFT (L)	<u>87</u> 2	55 * 1225 200	2568 2688	0.0340 0.1750 0.0667	0.0667	EB RIGHT (R) THRU (T) LEFT (L)	2650 2650 200 200	2650 200 200	1620 7000 3000	0.0000 0.3786 0.0667	0.3786
9	RIGHT (R) THEU (T) LEFT (L)	ភទ្ពិវ	3064 3064 425	7000 3000 3000	0.0333	•		200 200 200	36 ± 1450 200 200	1620 7000 3000	0.0222	0.0667
A A B	VOLUME-TO ADJUSTMEN TOTAL VOL	VOLUME-TO-CAPACITY RATIO FOR T ADJUSTMENT FOR LOST YELLOW TIM TOTAL VOLUME-TO-CAPACITY RATIO INTERSECTION LEVEL OF SERVICE:	문급든뛊	E INTERSECTION	CT1OK:	0.05 0.05 0.05 0.05	VOLUME-TO-C ADJUSTWENT TOTAL VOLUM INTERSECTIO	VOLUME-TO-CAPACITY RATIO FOR THE ROJUSTMENT FOR LOST YELLOW TIME: IDTAL VOLUME-TO-CAPACITY RATIO: INTERSECTION LEVEL OF SERVICE:	APACITY RATIO FOR THE FOR LOST YELLOW TIME E-TO-CAPACITY RATIO: H LEVEL OF SERVICE:	NE INTERSECTION:	T 3 OM:	28.00 28.00 28.00 28.00
	100000000000000000000000000000000000000	THE REPORT OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED I		***************************************			非常 化水色 医甲状腺 化水子 化二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十					

Š

TOTAL VOLUME-TO-CAPACITY RATIO:
INTERSECTION LEVEL OF SERVICE:
* ADJUSTED FOR RIGHT TURN ON RED
INT=2010R112_INT, VOL=2010R11_PNV, CAP=D:..FREMPEU.TAB

Š	Condition: 2010 WITH LONG-TERM LANE GEOMETRIES (AM)	DAOT HIM C	-1E-2 CARE -	GEORGIA IES		Troit I	5		The state of the s			- 61	CHECCHES CONTRACTOR OF THE PROPERTY OF THE PRO
NIE	INTERSECTION	2 MOHAVE	INTERSECTION 2 MONAVE DRIVE/MISSION BLVD	ION BLYD Per	11 90	CITY OF FRENCHT IK Hour	INTEL	INTERSECTION Count Date	2 MOHAVE	2 MOHAVE DRIVE/MISSION BLVD Time	GF 150	CITY (Peak Hour	CITY OF FREMONT
5	TJKM METHOD	RIGHT 125	RIGHT THRU LEFT			1 1 2 4 4 4 4 7 7	5	TJICH METHOD	RIGHT 200	THRU LEFT 150 200	•		
LEFT	, —;	1.0 1.0		ऊ ∙	#		LEFT	· -: 50 50	0, 7	1.0 1.0 1.0	1.1 1.1	Split? N 50 RIGHT 1450 THRU	STREET NAME:
THRU R 1GHT	14.73 50	> 4.0 (NO.	(NO. OF LAMES)	1.0	3225 THRU 225 LEFT	MISSION BLVO	RIGHT	150	9.6	1.0 1.0			
2 + 4	س	,		v Split? Y		SIG WARRANTS: Urb=Y, Rur=Y	3 + 4	> w	150	100 250 THINU RIGHT	v Split? Y		SIG WARRANTS: Urbet, Ruret
)		STREET NAME	STREET WANTE: MOHAVE DRIVE	RIVE			100000		STREET NAME: MOHAVE	STREET NAME: MOMAVE DRIVE	RIVE		## ## ## ## ## ## ## ## ## ## ## ## ##
1	MOVEMENT	ORIGINAL	ORIGINAL ADJUSTED ORIGINAL ADJUSTED ORIGINAL ADJUSTED ORIGINAL WOLLING VOLLING CAPACITY SU	CAPACITY	V/C 8AT10	CRITICAL V/C		MOVEMENT	ORIGINAL	ADJUSTED VOLUME*	CAPACITY	V/C RATIO	CRITICAL V/C
9	RIGHT (R) THRU (T) LEFT (C)	ភិសន្ត	. K.8	1,520 1,550 1,620	0.0019	0.1543	2	RIGHT (R) THRU (T) LEFT (L)	%5 2	85 <u>5</u>	25.23 25.23	0.0556 0.0571 0.0926	0.0926
8	$i \vdash$	25 87 82	នសនិ	2 <u>3</u> 25 027 023 023	0.0327	0.0926	话	RIGHT (R) THRU (T) LEFT (L)	82 <u>5</u> 2	115 * 150 200	23 55 55 56 56	0.0710 0.0857 0.1235	0.1235
•	i	కడ్బ	នក្នុង	1650 7000 1620	0.0303 0.2107 0.0154	0.0154		RIGHT (R) THRU (T) LEFT (L)	200 200 200 200 200 200 200 200 200 200	050 St	250 250 250 250 250 250 250 250 250 250	0.0909	0.4429
9		2225 2235 2255	3255 2255 2255 2255 255 255 255 255 255	5.52 5.52 5.53 5.53 5.53 5.53 5.53	0.0309 0.4694 0.1369 0.4767	0.4767	5 2	RIGHT (R) 50 THRU (T) 1450 LEFT (L) 200 T + R	50 1450 200	200 200 1500 1500	1620 6870 6870	0.0309 0.2111 0.2183	0.1235
i		O-CAPACITY NT FOR LOST LUME-TO-CAP	VOLUME-TO-CAPACITY RATIO FOR THE INTERSECTION ADJUSTMENT FOR LOST YELLOW TIME: TOTAL VOLUME-TO-CAPACITY RATIO: ENTRESECTION EMPT OF SERVICE:	THE INTERSECT	CTION:	7.0 0.08 0.82 0		VOLUME-TO ADJUSTMEN TOTAL VOL INTERSECT		10 FOR LLOW TH TY RATE SERVICE	HE INTERSECTION: WE: 0:	710M:	6.9.9 8.9.9 8.9.9

TJKM Transportation Consultants



MEMO

February 6, 1998

Project No.: 14-084

To:

Keith Meyer, P.E.

FAX 408 280-6803

From:

Chris D. Kinzel

Subject:

I-680/I-880 Cross-Connector HOV Volumes

TJKM has evaluated the potential traffic demand for one HOV lane and one mixed-flow lane on a two-lane ramp connector between 1-680 and 1-880 on Rt. 262 in Fremont. We had earlier estimated a total a.m. peak hour directional demand of about 2,500 vehicles. Based on our 1-680 studies, we estimate that between 20 percent and 30 percent of all vehicles will carry two or more persons and utilize an HOV lane. Under these circumstances there would be between 500 and 750 high-occupancy vehicles with 1,750 to 2,000 mixed-flow vehicles.

Given these numbers, it seem appropriate that both lanes be mixed-flow vehicles for the following reasons:

- 1. The length of the connector is relatively short and the normal pay-off from HOV lanes probably won't occur, even with HOV lanes on both of the connected freeways. Or, the incentive to carpool will be adequately established by HOV lanes on the other facilities, which have a greater ratio of mixed-flow to HOV lanes.
- 2. It will be difficult and costly to institute HOV lanes on the actual connectors with I-680 and I-880, reducing the effective length of the ramp connector HOV lanes.
- 3. There will be a significant lane imbalance between the HOV lane and the mixed-flow lane.

Although these reasons seem compelling, there is at least one important reason to consider either one HOV lane and one mixed-flow lane or even one HOV lane alone: if an HOV lane were added under a regional plan to achieve full HOV lane continuity over extended distances in order to strongly encourage HOV lane utilization, there would be justification to consider such a scheme for the Mission Boulevard (Rt. 262) corridor. Please let me know if there are questions on this material.

\97proj\14-084m.8ck

4234 Hacienda Drive, Suite 101, Pleasanton, California 94588-2721

CONCEPTUAL COST ESTIMATE SUMMARY

PROJECT NAME:

MISSION BOULEVARD - EXPRESS LANE

TYPE OF ESTIMATE:

CONCEPTUAL - EXPRESS LANES FROM I-880 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE:

06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP	GROUP DESCRIPTION	TOTAL COSTS (98\$)
O1	ADVANCE WORK	\$5,502,536
01	ADVANGE WORK	
02	EARTHWORK	\$315,000
03	DRAINAGE	\$1,157,900
04	PAVEMENT	\$2,096,750
05	STRUCTURES	\$28,013,120
06	MISCELLANEOUS	\$2,709,800
00	MIOGELETATESSS	
	TOTAL CONTRACT COST	\$39,795,106
07	WORK BY OTHERS	\$800,000
	SUBTOTAL	\$40,595,106
08	CONTINGENCY 25.0%	\$10,148,777
	TOTAL CONSTRUCTION COST	\$50,743,883
09	ENGINEERING AND MANAGEMENT	\$14,775,726
10	LAND AND RIGHT-OF-WAY	\$1,570,000
	SUBTOTAL	\$67,089,608
11	PROJECT RESERVE 10.0%	\$6,708,961
	TOTAL COST	\$73,798,569

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-680

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE:

06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH 0

CONTRACT NO:

R & M 97009

ROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$
01	TEMPORARY WORK, DETOURS, ETC.	%	15.0%	3.0%		\$1,038,133
01	MAINTENANCE OF UTILITIES	%	5.0%	2.0%		\$692,089
01	MOBILIZATION	%	12.0%	10.0%		\$3,460,444
01	CLEARING/GRUBBING	AC	\$2,240.00	\$2,240.00	8	\$17,920
01	DEMOLITION - AC PAVEMENT	SY	\$5.60	\$5. 6 0	20,000	\$112,000
01	DEMOLITION - PCC PAVEMENT	SY	\$39.20	\$39.20		\$1
01	DEMOLITION - CONCRETE	CY	\$123.00	\$123.00	650	\$79,95
01	DEMOLITION - BUILDING	CF	\$0.56	\$0.56		\$(
01	STORM WATER POLLUTION PREVENTION	LS	\$0.00	\$20,000.00	1	\$20,00
01	PROJECT SCHEDULES	LS	\$0.00	\$10,000.00	1	\$10,00
01	CONSTRUCTION FIELD OFFICE	LS	\$0.00	\$2,000.00	24	\$48,00
01	DEMOLITION BUILDING	SF	\$0.00	\$20.00	1,200	\$24,00
01	DEMOCRITION DOLLOWS		\$0.00	\$0.00		\$
01			\$0.00	\$0.00		\$
01			\$0.00	\$0.00		\$
01			\$0.00	\$0.00		1
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00] :
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		
01			\$0.00	\$0.00		1
	l .		\$0.00	\$0.00		
01	·		\$0.00	\$0.00		
01			\$0.00	\$0.00		
01	1		\$0.00	\$0.00		
01			\$0.00	\$0.00		
01 01			\$0.00	\$0.00		
U1	1		1 40.00	1 45.00		
	TOTAL FOR ITEM 01 ADVANCE WORK					\$5,502,5

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE: 06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

DH BY:

R & M 97009 CONTRACT NO:

REV:

GROUP			GUIDE	PROPONENT		TOTAL		
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)		
02	ROADWAY EXCAVATION	CY	\$9.00	\$9.00	33,000	\$297,000		
02	IMPORTED BORROW	CY	\$14.50	\$14.50		\$0		
02	EROSION CONTROL	AC	\$4,500.00	\$4,500.00	4	\$18,000		
02		- 1 1	\$0.00	\$0.00		\$0		
02		1 1	\$0.00	\$0.00		\$0		
02	ľ	1 1	\$0.00	\$0.00	l 1	\$0		
02	1	1 1	\$0.00	\$0.00		\$0		
02	ŀ	1 1	\$0.00	\$0.00		\$(
02	l	1 1	\$0.00	\$0.00		\$0		
02		1 1	\$0.00	\$0.00		\$0		
02		1 1	\$0.00	\$0.00		\$0		
02		1 1	\$0.00	\$0.00		\$0		
02		1	\$0.00	\$0.00		\$(
02		1	\$0.00	\$0.00		\$(
02	,		\$0.00	\$0.00	1	\$		
02		10	\$0.00	\$0.00		\$		
02		4 1	\$0.00	\$0.00		\$		
02	1		\$0.00	\$0.00		\$		
02			\$0.00	\$0.00		\$		
02			\$0.00	\$0.00		\$		
02			\$0.00	\$0.00		\$		
02		1 1	\$0.00	\$0.00	1	\$		
02	N.	1 1	\$0.00	\$0.00		\$		
02	1	1 1	\$0.00	\$0.00		\$		
02		1 1	\$0.00	\$0.00		1 5		
02		1 1	\$0.00	\$0.00				
02		1 1	\$0.00	\$0.00		1 1		
02		1 1	\$0.00	\$0.00		\$		
02		1 1	\$0.00	\$0.00		1 1		
02			\$0.00	\$0.00				
02		1 1	\$0.00	\$0.00		;		
02		1 1	\$0.00	\$0.00				
		1 1	\$0.00	\$0.00				
02 02			\$0.00	\$0.00				
	TOTAL FOR ITEM 02 EARTHWORK							

PROJECT NAME: TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE: 06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP			GUIDE	PROPONENT	le outening in the	TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
03	DRAINAGE DITCH 9'TOPx3'DEEP	LF	\$224.00	\$224.00		\$0
03	DRAINAGE DITCH 4'TOPx2'DEEP	LF	\$112.00	\$112.00	2,000	\$224,000
03	REINFORCED CONCRETE PIPE 18"	LF	\$67.00	\$67.00	2,000	\$134,000
03	REINFORCED CONCRETE PIPE 24"	LF	\$84.00	\$84.00		\$0
03	REINFORCED CONCRETE PIPE 36"	LF	\$112.00	\$112.00	3,500	\$392,000
03	DRAINAGE STRUCTURES (CATCHBASINS, MANHOLES)	EA	\$1,720.00	\$1,720.00	70	\$120,400
03	BOX CULVERTS	LF	\$448.00	\$448.00		\$0
03	CLAY SEWER PIPE 6"	LF	\$35.00	\$35.00	500	\$17,500
03	CLAY SEWER PIPE 12"	LF	\$45.00	\$45.00	6,000	\$270,000
03			\$0.00	\$0.00		\$(
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03	1		\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03	i		\$0.00	\$0.00		\$
03			\$0.00	\$0.00	1	\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		\$
03			\$0.00	\$0.00		1
03			\$0.00	\$0.00		
03			\$0.00	\$0.00	11	
03			\$0.00	\$0.00		
03			\$0.00	\$0.00		
	TOTAL FOR ITEM 03 DRAINAGE					\$1,157,90

PROJECT NAME:
TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE: 06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
04	ASPHALT CONCRETE PAVEMENT	SY	\$41.50	\$41.50	41,000	\$1,701,500
04	PC CONCRETE PAVEMENT	SY	\$47.50	\$47.50		\$0
04	STRIPING	LF	\$0.45	\$0.45	60,000	\$27,000
04	MARKINGS	SF	\$3.15	\$3.15	5,000	\$15,750
04	CURB & GUTTER	LF	\$0.00	\$15.00	15,500	\$232,500
04	SIDEWALK	SF	\$0.00	\$5.00	24,000	\$120,000
04			\$0.00	\$0.00		\$(
04		1 1	\$0.00	\$0.00		\$0
04			\$0.00	\$0.00	1	\$(
04		- 1 1	\$0.00	\$0.00		\$1
04			\$0.00	\$0.00		\$(
04		1 1	\$0.00	\$0.00		\$
04		1 1	\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04			\$0.00	\$0.00		\$
04		1 1	\$0.00	\$0.00		\$
04	l .	1 1	\$0.00	\$0.00		5
04		1 1	\$0.00	\$0.00	ł	\$
04			\$0.00	\$0.00		\$
04		1 1	\$0.00	\$0.00		5
04		1 1	\$0.00	\$0.00	l .	\$
04		1 1	\$0.00	\$0.00		5
04	1		\$0.00	\$0.00		\$
04	1	1 1	\$0.00	\$0.00		1
04			\$0.00	\$0.00	1	\$
04			\$0.00	\$0.00	1	
04			\$0.00	\$0.00	1	1
04			\$0.00	\$0.00		3
04			\$0.00	\$0.00	1	- 1
TOTAL FOR ITEM 04 PAVEMENT						

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-680

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE:

06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
05	BRIDGES	SF	\$119.00	\$120.00	215,000	\$25,800,000
05	RETAINING WALLS-UNDER 5' HIGH	LF	\$168.00	\$168.00	2,340	\$393,120
05	RETAINING WALLS-OVER 5' HIGH	LF	\$504.00	\$504.00	3,100	\$1,562,400
05	SOUNDWALLS	LF	\$224.00	\$224.00	1,150	\$257,600
05			\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00	1 1	\$0
05		1	\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00	1 1	\$0
05		1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05	U.	1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05	1		\$0.00	\$0.00		\$0
05	1		\$0.00	\$0.00		\$0
05	1	1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05	ì		\$0.00	\$0.00		\$0
05	1	1	\$0.00	\$0.00		\$0
05	1	1	\$0.00	\$0.00		\$0
05		1	\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05			\$0.00	\$0.00		\$0
05			\$0.00	\$0.00	l	\$0
	TOTAL FOR ITEM 05 STRUCTURES					\$28,013,120

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE:

06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
06	FENCING	LF	\$18.00	\$18.00	1,500	\$27,000
06	CONCRETE BARRIER	LF	\$80.00	\$80.00	3,500	\$280,000
06	METAL BEAM BARRIER	LF	\$30.00	\$30.00	2,000	\$60,000
06	TRAFFIC SIGNALS	INT	\$150,000.00	\$150,000.00	2	\$300,000
06	LIGHTING	MI	\$166,000.00	\$166,000.00	1	\$166,000
06	SIGNING - ON RAMP	RMP	\$4,700.00	\$4,700.00	2	\$9,400
06	SIGNING - OFF RAMP	RMP	\$89,000.00	\$89,000.00	2	\$178,000
06	SIGNING - ADD ROADWAY	MI	\$9,600.00	\$9,600.00	1	\$9,600
06	TRUSS SIGNS	EA	\$38,000.00	\$38,000.00	4	\$152,000
06	ROAD SIDE SIGNS	EA	\$356.00	\$356.00	50	\$17,800
06	LANDSCAPING	SF	\$1.10	\$5.00	150,000	\$750,000
06	HAZARDOUS MATERIAL	LS	\$0.00	\$100,000.00	2	\$200,000
06	ENVIRONMENTAL MITIGATION	LS	\$0.00	\$100,000.00	2	\$200,000
06	IRRIGATION SYSTEM	LS	\$0.00	\$50,000.00	4	\$200,000
06	RAMP METERING SYSTEM	EA	\$0.00	\$80,000.00	2	\$160,000
06	RAMP METERING SYSTEM	EA	\$0.00	\$100,000.00		\$
06	RAMP METERING SYSTEM		\$0.00	\$250,000.00		\$(
06	3.50 (3.50 (3.50))	1 1	\$0.00	\$0.00		\$(
06	1	1 1	\$0.00	\$0.00		\$(
06	1		\$0.00	\$0.00		\$
06	1		\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
06	1		\$0.00	\$0.00		\$
06			\$0.00	\$0.00	1	\$
06	1		\$0.00	\$0.00	ŀ	\$
06		1 1	\$0.00	\$0.00		\$
06		1 1	\$0.00	\$0.00	1	\$
06		1 1	\$0.00	\$0.00		\$
06		1 1	\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		\$
	TOTAL FOR ITEM 06 MISCELLANEO	US				\$2,709,80

PROJECT NAME: TYPE OF ESTIMATE: **MISSION BOULEVARD - EXPRESS LANE**

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

PG & E

SEWER

EBMUD

BART CABLE TV

PACIFIC BELL

GROUP

CODE

07

07

07

07 07

07

07 07 07

07

07

07

07

Congestion Management Agency

DATE:

06-Nov-97 DH

DESIGN CONSULTANT:

RAILROAD COMPANIES

MATERIAL FURNISHED BY

R & M Consulting Engineers Inc.

BY:

0 REV:

CONTRACT NO:

R & M 97009

LS

LS

LS

LS

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

1

1

1

	1	GUIDE	PROPONENT		TOTAL
ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
	LS	\$0.00	\$250,000.00	1	\$250,000
BELL	LS	\$0.00	\$200,000.00	1	\$200,000
AD COMPANIES	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$250,000.00	1	\$250,000
	LS	\$0.00	\$0.00	1	\$0
~	LS	\$0.00	\$100,000.00	1	\$100,000
	LS	\$0.00		1	\$0
AL FURNISHED BY OTHERS	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
Vi Vi	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0

\$0

\$0

\$0

\$0

PROJECT NAME: TYPE OF ESTIMATE:

CONSTRUCTION MANAGEMENT

PROJECT MANAGEMENT

PUBLIC INFORMATION

MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

LS

%

LS

LS

LS

LS

LS

LS

LS

LS

TOTAL FOR ITEM 09 ENGINEERING AND MANAGEMENT

PROPONENT:

GROUP CODE

> 09 09 09

> 09

09 09

09

09 09

09 09 09

09

09

09

09

09

09

09

09

09

09

09

09

Congestion Management Agency

DATE: BY:

06-Nov-97 DH

\$0

\$0

\$0

\$0

\$0

\$0

\$0

\$50,000

\$10,000

\$14,775,726

\$5,074,388

R & M Consulting Engineers Inc. R & M 97009

REV:

0

DESIGN CONSULTANT:
CONTRACT NO:

		GUIDE	PROPONENT		TOTAL
ITEM DESCRIPTION	דואט	PRICE	PRICE	QUANTITY	COST (1998\$)
ENGINEERING STUDIES	%	4.0%	2.0%		\$1,014,878
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
ENVIRONMENTAL STUDIES	%	5.0%	2.0%		\$1,014,878
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
DESIGN ENGINEERING	%	10.0%	10.0%		\$5,074,388
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
CONSTRUCTION ENGINEERING	%	3.0%	3.0%		\$1,522,316
	LS	\$0.00	\$0.00	1	\$0
	LS	\$0.00	\$0.00	1	\$0
CONSTRUCTION STAKING	%	2.0%	2.0%		\$1,014,878
	lısl	\$0.00	\$0.00	1	\$0

\$0.00

10.0%

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

10.0%

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

\$0.00

1

1

1

1

1

\$50,000.00

\$10,000.00

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

BRIDGE OPTION

PROPONENT:

Congestion Management Agency

DATE: 06-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

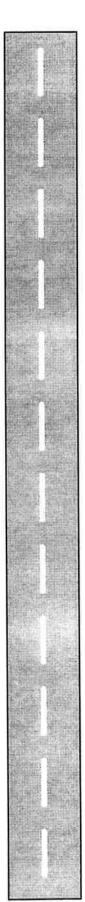
BY: DH

CONTRACT NO:

R & M 97009

0

GROUP			GUIDE	PROPONENT		TOTAL	
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)	
10	LAND COST :						
10	PARCEL NO	SF	\$0.00	\$20.00	60,000	\$1,200,000	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	RELOCATIONS:					****	
10	PARCEL NO.	LS	\$0.00	\$200,000.00	1	\$200,000	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO	LS	\$0.00	\$0.00	1	\$0	
10	PARCEL NO	LS	\$0.00	\$0.00	1	\$0	
40	ACCUMENTION SERVICES	LS	\$0.00	\$20,000.00	1	\$20,000	
10 10	ACQUISITION SERVICES IR.O.W. ENGINEERING	LS	\$0.00	\$150,000.00	1	\$150,000	
10	UTILITY RELOCATIONS	LS	\$0.00	\$0.00	1	\$0	
10	HAZARDOUS MATERIAL REMEDIATION	LS	\$0.00	\$0.00	1	\$0	
10	SUBTOTAL		75/55			\$1,570,000	
10	CONTINGENCY	%	0.00%	0.00%		\$0	
	TOTAL FOR ITEM 10 LAND AND RIGHT-OF-WAY						



Rajappan&Meyer

Rajappan & Meyer Consulting Engineers, Inc. 610 16th Street Suite 215, Oakland, CA 94612 (510) 986-1996 (510) 986-1997 fax

CONCEPTUAL COST ESTIMATE SUMMARY

PROJECT NAME:

MISSION BOULEVARD - EXPRESS LANE

TYPE OF ESTIMATE:

CONCEPTUAL - EXPRESS LANES FROM 1-680 TO 1-880

WB BRIDGE& EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP		TOTAL
CODE	GROUP DESCRIPTION	COSTS (98\$)
01	ADVANCE WORK	\$4,772,537
02	EARTHWORK	\$207,000
03	DRAINAGE	\$1,157,900
04	PAVEMENT	\$1,440,250
05	STRUCTURES	\$14,261,600
06	MISCELLANEOUS	\$3,036,800
	TOTAL CONTRACT COST	\$24,876,087
07	WORK BY OTHERS	\$800,000
	SUBTOTAL	\$25,676,087
08	CONTINGENCY 25.0%	\$6,419,022
	TOTAL CONSTRUCTION COST	\$32,095,109
09	ENGINEERING AND MANAGEMENT	\$9,407,582
10	LAND AND RIGHT-OF-WAY	\$1,050,000
	SUBTOTAL	\$42,552,691
11	PROJECT RESERVE 10.0%	\$4,255,269
	TOTAL COST	\$46,807,960

PROJECT NAME: TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE
CONCEPTUAL - EXPRESS LANES FROM I-880 TO I-880
WB BRIDGE & EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE: 26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
01	TEMPORARY WORK, DETOURS, ETC.	%	15.0%	6.0%		\$1,264,886
01	MAINTENANCE OF UTILITIES	%	5.0%	2.0%		\$421,629
01	MOBILIZATION	%	12.0%	10.0%		\$2,108,143
01	CLEARING/GRUBBING	AC	\$2,240.00	\$2,240.00	8	\$17,920
01	DEMOLITION - AC PAVEMENT	SY	\$5.60	\$5.60	10,000	\$56,000
01	DEMOLITION - PCC PAVEMENT	SY	\$39.20	\$39.20		\$0
01	DEMOLITION - CONCRETE	CY	\$123.00	\$123.00	6,520	\$801,960
01	DEMOLITION - BUILDING	CF	\$0.56	\$0.56	0	\$0
01	STORM WATER POLLUTION PREVENTION PLAN	LS	\$0.00	\$20,000.00	1	\$20,000
01	PROJECT SCHEDULES	LS	\$0.00	\$10,000.00	1	\$10,000
01	CONSTRUCTION FIELD OFFICE	LS	\$0.00	\$2,000.00	24	\$48,000
01	DEMOLITION BUILDING	SF	\$0.00	\$20.00	1,200	\$24,000
01	Southern Market Control Control Control		\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00	ŀ	\$0
01			\$0.00	\$0.00	V	\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01	1		\$0.00	\$0.00		\$0
01		1	\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00		\$0
01			\$0.00	\$0.00	ł.	\$0
01			\$0.00	\$0.00	-	\$0
01			\$0.00	\$0.00		\$0
	TOTAL FOR ITEM 01 ADVANCE WORK					\$4,772,537

PROJECT NAME: TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE: 26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

GROUP		$\neg r$	GUIDE	PROPONENT		TOTAL	
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998)	
02	ROADWAY EXCAVATION	CY	\$9.00	\$9.00	21,000	\$189,00	
02	IMPORTED BORROW	CY	\$14.50	\$14.50			
02	EROSION CONTROL	AC	\$4,500.00	\$4,500.00	4	\$18,00	
02		1 1	\$0.00	\$0.00		:	
02			\$0.00	\$0.00			
02			\$0.00	\$0.00			
02	1	1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00		1	
02		1 1	\$0.00	\$0:00			
02		1 1	\$0.00	\$0.00			
02	1	1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02	1		\$0.00	\$0.00			
02	1	1 1	\$0.00	\$0.00			
02			\$0.00	\$0.00			
02			\$0.00	\$0.00			
02			\$0.00	\$0.00			
02	I.	8	\$0.00	\$0.00		İ	
02			\$0.00	\$0.00		1	
02	Ti.		\$0.00	\$0.00	1		
02	1	1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02	1	1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02	1	1 1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02	1	1	\$0.00	\$0.00			
02		1 1	\$0.00	\$0.00			
02			\$0.00	\$0.00			
TOTAL FOR ITEM 02 EARTHWORK							

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

26-Nov-97 DATE:

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY: DH

CONTRACT NO:

R & M 97009

RE

E۷	:	0

03 D 03 R 03 R 03 R	ITEM DESCRIPTION DRAINAGE DITCH 9'TOPX3'DEEP DRAINAGE DITCH 4'TOPX2'DEEP REINFORCED CONCRETE PIPE 18" REINFORCED CONCRETE PIPE 24" REINFORCED CONCRETE PIPE 36"	UNIT LF LF LF LF	GUIDE PRICE \$224.00 \$112.00 \$67.00	PRICE \$224.00 \$112.00 \$67.00	QUANTITY 2,000	COST (1998\$) \$0 \$224,000
03 D 03 D 03 R 03 R 03 R	DRAINAGE DITCH 9'TOPx3'DEEP DRAINAGE DITCH 4'TOPx2'DEEP REINFORCED CONCRETE PIPE 18" REINFORCED CONCRETE PIPE 24"	LF LF	\$112.00 \$67.00	\$112.00	2,000	
03 D 03 R 03 R 03 R	DRAINAGE DITCH 4'TOPx2'DEEP REINFORCED CONCRETE PIPE 18" REINFORCED CONCRETE PIPE 24"	LF LF	\$67.00		2,000	\$224,000
03 R 03 R 03 R	REINFORCED CONCRETE PIPE 24"	LF		\$67 00		
03 R				Ψ07.00	2,000	\$134,000
03 R		I IE	\$84.00	\$84.00		\$0
03	2	1 -	\$112.00	\$112.00	3,500	\$392,000
	DRAINAGE STRUCTURES	EA	\$1,720.00	\$1,720.00	70	\$120,400
1	(CATCHBASINS, MANHOLES)					
03 B	BOX CULVERTS	LF	\$448.00	\$448.00	1	\$0
03	CLAY SEWER PIPE 6"	LF	\$35.00	\$35.00	500	\$17,500
03 0	CLAY SEWER PIPE 12"	LF	\$45.00	\$45.00	6,000	\$270,000
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00	1	\$0
03			\$0.00	\$0.00		\$0
ОЗ			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1 1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		1	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03		4	\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00		\$0
03			\$0.00	\$0.00	l	\$0
	TOTAL FOR ITEM 03 DRAINAGE					\$1,157,900

PROJECT NAME: TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

V: 0

GROUP		\top	GUIDE	PROPONENT		TOTAL	
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)	
04	ASPHALT CONCRETE PAVEMENT	SY	\$41.50	\$41.50	25,000	\$1,037,500	
04	PC CONCRETE PAVEMENT	SY	\$47.50	\$47.50		\$0	
04	STRIPING	LF	\$0.45	\$0.45	60,000	\$27,000	
04	MARKINGS	SF	\$3.15	\$3.15	5,000	\$15,750	
04	CURB & GUTTER	LF	\$0.00	\$15.00	15,000	\$225,000	
04	SIDEWALK	SF	\$0.00	\$5.00	27,000	\$135,000	
04			\$0.00	\$0.00	1	\$0	
04			\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04	f		\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00	,	\$0	
04		1 1	\$0.00	\$0.00	i i	\$0	
04		1 1	\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
04		1 1	\$0.00	\$0.00	Ĺ	\$0	
04			\$0.00	\$0.00		\$0	
04			\$0.00	\$0.00		\$0	
	TOTAL FOR ITEM 04 PAVEMENT						

PROJECT NAME: TYPE OF ESTIMATE:

MISSION BOULEVARD - EXPRESS LANE CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

DATE:

26-Nov-97

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
05	BRIDGES	SF	\$119.00	\$120.00	105,500	\$12,660,000
05	RETAINING WALLS-UNDER 5' HIGH	LF	\$168.00	\$168.00	800	\$134,40
05	RETAINING WALLS-OVER 5' HIGH	LF	\$504.00	\$504.00	2,400	\$1,209,60
05	SOUNDWALLS	LF	\$224.00	\$224.00	1,150	\$257,60
05		1	\$0.00	\$0.00		\$
05		1 1	\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05		1	\$0.00	\$0.00		\$
05		1 1	\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05		1	\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05		1	\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
05		1	\$0.00	\$0.00		\$
05	1		\$0.00	\$0.00		\$
05	I		\$0.00	\$0.00		\$
05		1	\$0.00	\$0.00		\$
05	1		\$0.00	\$0.00		\$
_ 05		1	\$0.00	\$0.00		\$
05	l		\$0.00	\$0.00		\$
05	1	1	\$0.00	\$0.00		\$
05	1	1	\$0.00	\$0.00		s
05	1	1	\$0.00	\$0.00		\$
05	1		\$0.00	\$0.00		\$
05			\$0.00	\$0.00		\$
	TOTAL FOR ITEM 05 STRUCTURES					\$14,261,60

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$
06	FENCING	LF	\$18.00	\$18.00	1,500	\$27,00
06	CONCRETE BARRIER	LF	\$80.00	\$80.00	1,200	\$96,00
06	METAL BEAM BARRIER	LF	\$30.00	\$30.00	1,000	\$30,00
06	TRAFFIC SIGNALS	INT	\$150,000.00	\$150,000.00	2	\$300,00
06	LIGHTING	MI	\$166,000.00	\$166,000.00	1	\$166,00
06	SIGNING - ON RAMP	RMP	\$4,700.00	\$4,700.00	2	\$9,40
06	SIGNING - OFF RAMP	RMP	\$89,000.00	\$89,000.00	1	\$89,00
06	SIGNING - ADD ROADWAY	MI	\$9,600.00	\$9,600.00	1	\$9,60
06	TRUSS SIGNS	EA	\$38,000.00	\$38,000.00	4	\$152,00
06	ROAD SIDE SIGNS	EA	\$356.00	\$356.00	50	\$17,80
06	LANDSCAPING	SF	\$1.10	\$15.00	92,000	\$1,380,00
06	HAZARDOUS MATERIAL	LS	\$0.00	\$100,000.00	2	\$200,00
06	ENVIRONMENTAL MITIGATION	LS	\$0.00	\$100,000.00	2	\$200,00
06	IRRIGATION SYSTEM	LS	\$0.00	\$50,000.00	4	\$200,00
06	RAMP METERING SYSTEM	EA	\$0.00	\$80,000.00	2	\$160,00
06	RAMP METERING SYSTEM	EA	\$0.00	\$100,000.00		•
06	RAMP METERING SYSTEM	1 1	\$0.00	\$250,000.00		
06		1 1	\$0.00	\$0.00		
06		1 1	\$0.00	\$0.00		\$
06		- 1 - 1	\$0.00	\$0.00		
06		1 1	\$0.00	\$0.00		
06		- 1	\$0.00	\$0.00		:
06		1 1	\$0.00	\$0.00		
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		
06		1 i	\$0.00	\$0.00		
06		1 1	\$0.00	\$0.00		
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		•
06			\$0.00	\$0.00		•
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		•
06			\$0.00	\$0.00		\$
06			\$0.00	\$0.00		
	TOTAL FOR ITEM 06 MISCELLANEOU	JS				\$3,036,80

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-680

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$)
07	PG & E	LS	\$0.00	\$250,000.00	1	\$250,000
07	PACIFIC BELL	LS	\$0.00	\$200,000.00	1	\$200,000
07	RAILROAD COMPANIES	LS	\$0.00	\$0.00	1	\$0
07	SEWER	LS	\$0.00	\$0.00	1	\$0
07	EBMUD	LS	\$0.00	\$250,000.00	1	\$250,000
07	BART	LS	\$0.00	\$0.00	1	\$0
07	CABLE TV	LS	\$0.00	\$100,000.00	1	\$100,000
07		LS	\$0.00		1	\$0
07		1				
07	MATERIAL FURNISHED BY OTHERS	LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07	5	LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07	1	LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
07		LS	\$0.00	\$0.00	1	\$0
	TOTAL FOR ITEM 07 WORK BY OTHER	S {				\$800,000

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DΗ

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL
CODE	ITEM DESCRIPTION	UNIT	PRICE		QUANTITY	
09	ENGINEERING STUDIES	%	4.0%	2.0%		\$641,902
09		LS	\$0.00	\$0.00	1	\$0
09		LS	\$0.00	\$0.00	1	\$(
09	ENVIRONMENTAL STUDIES	%	5.0%	2.0%	1	\$641,90
09		LS	\$0.00	\$0.00	1	\$(
09		LS	\$0.00	\$0.00	1	\$(
09	DESIGN ENGINEERING	%	10.0%	10.0%		\$3,209,51
09		LS	\$0.00	\$0.00	1	\$(
09	:	LS	\$0.00	\$0.00	1	\$(
09	CONSTRUCTION ENGINEERING	%	3.0%	3.0%		\$962,85
09		LS	\$0.00	\$0.00	1	\$
09		LS	\$0.00	\$0.00	1	\$
09	CONSTRUCTION STAKING	%	2.0%	2.0%		\$641,90
09		LS	\$0.00	\$0.00	1	\$
09		LS	\$0.00	\$0.00	1	\$
09	CONSTRUCTION MANAGEMENT	%	10.0%	10.0%		\$3,209,51
09		LS	\$0.00	\$0.00	1	\$
09		LS	\$0.00	\$0.00	1	\$
09	PROJECT MANAGEMENT	LS	\$0.00	\$50,000.00	1	\$50,00
09		LS	\$0.00	\$0.00	1	\$
09		LS	\$0.00	\$0.00	1	\$
09	PUBLIC INFORMATION	LS	\$0.00	\$50,000.00	1	\$50,00
09		LS	\$0.00	\$0.00	1	\$
09		LS	\$0.00	\$0.00	1	
	TOTAL FOR ITEM 09 ENGINEERING	AND MANA	GEMENT			\$9,407,58

PROJECT NAME: TYPE OF ESTIMATE: MISSION BOULEVARD - EXPRESS LANE

CONCEPTUAL - EXPRESS LANES FROM I-680 TO I-880

WB BRIDGE \$ EB 4-LANE OPTION

PROPONENT:

Congestion Management Agency

DATE:

26-Nov-97

DESIGN CONSULTANT:

R & M Consulting Engineers Inc.

BY:

DH

CONTRACT NO:

R & M 97009

REV:

GROUP			GUIDE	PROPONENT		TOTAL	
CODE	ITEM DESCRIPTION	UNIT	PRICE	PRICE	QUANTITY	COST (1998\$	
10	LAND COST:						
10	PARCEL NO	SF	\$0.00	\$20.00	34,000	\$680,00	
10	PARCEL NO.	LS	\$0.00	\$0.00	, 1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	19	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO	LS	\$0.00	\$0.00	1	\$	
10	RELOCATIONS:						
10	PARCEL NO	LS	\$0.00	\$200,000.00	1	\$200,00	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	PARCEL NO.	LS	\$0.00	\$0.00	1	\$	
10	ACQUISITION SERVICES	LS	\$0.00	\$20,000.00	1	\$20,00	
10	R.O.W. ENGINEERING	LS	\$0.00	\$150,000.00	1	\$150,00	
10	UTILITY RELOCATIONS	LS	\$0.00	\$0.00	1	\$	
10	HAZARDOUS MATERIAL REMEDIATION	LS	\$0.00	\$0.00	1	\$	
	SUBTOTAL					\$1,050,00	
10	CONTINGENCY	%	0.00%	0.00%		- s	
TOTAL FOR ITEM 10 LAND AND RIGHT-OF-WAY							